OCTOBER 4, 1945

The

OCT 8 1945

LIBRARY

IRON AGE



INLAND STEEL CO

Marie Arriva

Land to the state of the state



Why **SPEEDAIRE**—Cleveland's new Fan-Cooled Drive — delivers "more horsepower for your dollar"

- The Induction Fan continually removes heat by means of a high-velocity air stream scouring the surfaces of the oil reservoir.
- Because Speedaire is Fan-Cooled, it will do more work—will deliver up to double the borsepower of standard worm units of equal frame size, at usual motor speeds.
- Speedaire can be installed economically on many applications where other types have been used heretofore—giving you the advantages of a compact right-angle Drive.
- Speedaire is furnished in 6 standard sizes -from 3 to 95 H.P.

"We have to be production-minded in this place—we operate around the clock, 300 days a year. That throws a stiff load on the Reducers that drive our equipment—but we have been using Cleveland Worm Gear Speed Reducers since 1923, so we know by experience that they can 'take it.'

Bridg bolize Wi fiftiet bridg built many Ar bridg strat

iden

"Now we're hearing about Speedaire—Cleveland's New Fan-Cooled Unit that delivers more horsepower per dollar. We're always interested in bigger returns—so Speedaire, backed by Cleveland's good name, is going on our new equipment from here on."

The New Speedaire Unit incorporates details that have distinguished Cleveland Drives for over 30 years—with Fan-Cooling added. Shall we send a copy of Speedaire Catalog 300?



THE CLEVELAND WORM & GEAR COMPANY 3252 East 80th Street • Cleveland 4, Ohio

Affiliate

THE FARVAL CORPORATION, Centralized Systems of Lubrication In Canada: Peacock Brothers, Limited

Cleveland
SPEEDAIRE Worm Gear Reduction Units
FAN COOLED

BETHLEHEM Bridge Builder

Bridges, arching against many diverse skylines, ever symbolize the country's restless dynamic growth.

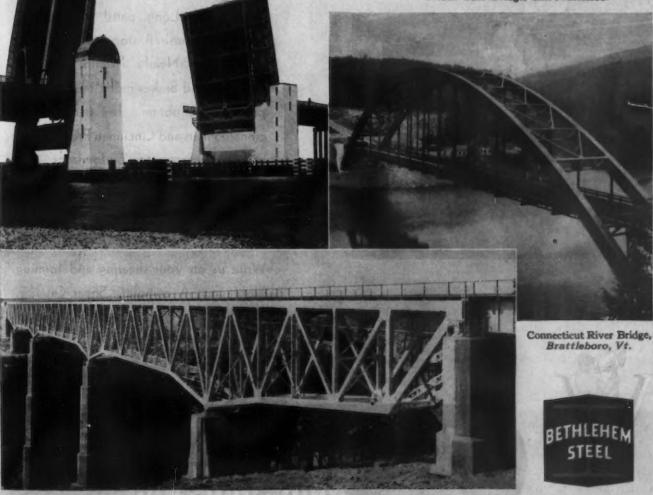
With experience back of it which now approaches its fiftieth year, Bethlehem has a leading place among American bridge-builders. In the years preceding the war, Bethlehem built some of the nation's greatest bridges-often had as many as five under way at one time.

Among the factors which have made Bethlehem a major bridge-builder are its high degree of engineering skill, its ample, strategically-located fabrication and erection facilities, and its identity as a wholly-integrated steel producer.

Mill Basin Bridge, Shore Parkway, Brooklyn.



Golden Gate Bridge, San Francisco.



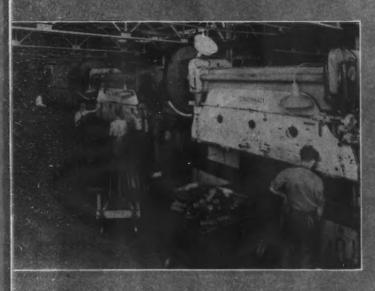
Texas and New Orleans Railroad Bridge, Pecos River, High Bridge, Texas.



"TRAILBLAZERS"

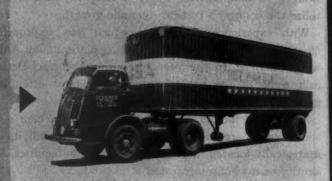
Grow on this line ...





Courtesy of Trailmobile Co.





Long line! Long parts! Short time! That is the nutshell story of Trailblazer production. Nearly a tenth of a mile of Shears and Brakes meets this intensive production problem. This team of Cincinnati Shears and Cincinnati Press Brakes, with their accurate performance and ample working lengths, smoothly and economically handles the long pieces required.

Write us on your shearing and forming problems. A complete Shear Catalog, No. S-4, and Brake Catalog, No. B-2, are available on request.

THE CINCINNATI SHAPER CO.

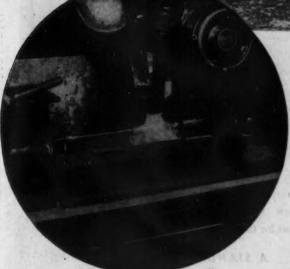
CINCINNATI 25, DHIO U.S.A.

Oils. mach tool chang

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- * Lubricate the tools
- * Carry away heat
- * Prevent chip welding
- * Assure higher speeds and feeds
- * Prolong tool life

To GET all these benefits, use Trexaco Cutting and Soluble Oils. They assure not only faster machining, but also more cuts per tool grind, less downtime for tool changes, and improved finish.

Texaco Cutting and Soluble Oils are typical examples of petroleum products improved through The Texas Company's constant research. Texaco cutting fluids, each designed especially to improve the efficiency of a particular type of cutting, are

produced by modern Texaco methods in one of the world's largest refineries... and absolute uniformity is assured by skilled technicians who supervise every step of production from well to finished product.

The services of a Texaco Engineer specializing in cutting coolants are available through more than 2300 Texaco distributing plants in the 48 States. Get in touch with the nearest one, or write The Texas Company, 135 E. 42nd St., New York 17, N. Y.

RECONVERSION RUSTPROOFING

4 Points to Remember

- Ordnance Specification P. S. 300-4 contains official instructions for the complete procesing of Government-owned production equipment.
- These instructions require that only rustproofing materials meeting Government specifications be used.
- Texaco rustproofing products meet Ordnance specifications for application on Government-owned equipment.
- For full information, see your Texaco representative or write to us.



TEXACO CUTTING, SOLUBLE AND HYDRAULIC OILS MASKANING

TUNE IN THE TEXACO STAR THEATRE WITH THAT MELTON EVERY SUNDAY NIGHT - CBS

WEST VIRGINIA UNIVERSITY THE IRON AGE, October 4, 1945-5

Turn to the pioneer for

Expert Counsel

on peacetime production plans

With material and manufacturing costs at a new high level, competition in the postwar era promises to be more keen than industry has ever known before.

Manufacturers who realize this are taking steps now to make certain that their postwar programs take full advantage of the newest and most efficient manufacturing tools and processes available.

In the field of abrasives, it is only natural that they should turn to Peninsular—the pioneer in grinding wheel progress.

Today, as always, Peninsular is maintaining its position of leadership through the same endless

study and research which has resulted in the development of new materials for abrasive wheels—new methods for their manufacture—new means for their application to industrial problems.

A STANDING INVITATION

Our expert staff of factory and field engineers are ready today to help in your postwar preparation—with a production, engineering and cost analysis service beyond any offered up to now in the industry.

The Peninsular Grinding Wheel Company, 729 Meldrum Ave., Detroit 7. Sales Offices: Chicago, Philadelphia, Cleveland, Newark, Pittsburgh.

SPECIALISTS IN RESINOID BONDED WHEELS

PENINSULAR

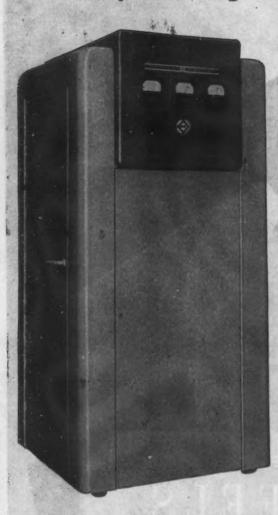
Various types of segments used for surface grinding.



THE IRON AGE, October 4, 1945-7

Allis-Chalmers Electronic Head Market 1998

Compare Engineering: A-C's years of industrial electronic experience give you superior operating features.



CONVENIENCE, economy, low cost — the magic of induction heating at its finest — that's what Allis-Chalmers new Electronic Heater now offers you!

Completely Automatic: Pre-set timer controls heat sequence from 2/10 seconds to 2 minutes — so that even unskilled operators can harden and braze metal parts in volume — uniformly — at simple touch of starter button. All controls are located on one panel for easy change in applications. Job settings are protected from tampering by door and lock.

High Efficiency: 3-phase rectifying system guarantees maximum power from Electronic Heater, prevents unbalanced load on power lines. All tubes carry manufacturer's guarantee (minimum: 1000 hours), often have useful life in excess of 5000 hours. New coupling system keeps losses low, permits adaptation to most applications without use of radio frequency transformers.

Safety Features: Operator and equipment are fully protected by heavy-duty control, fuses, high water-temperature relay, interfocking switches on door, choke coil, water filters and pressure switches.

Maybe your manufacturing operation can be performed better, faster, cheaper with this great new production tool. Write for further information, or send samples for free laboratory test. No obligation. Allis-Chalmers, Electronic Devices Section, Milwaukee 1, Wisconsin.

Pioneer Builders of Electronic A Equipment for Industry.

Allis



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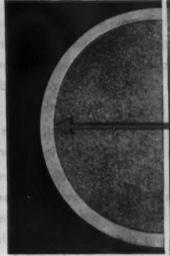
Heater Now Offers You A

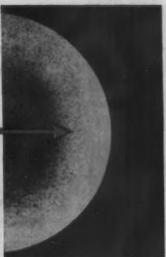
METAL MAGIC

Compare Results: High frequencies, accurate control of A-C's new unit give you finer products at lower costs.



C-





INCREASES PRODUCTION

Joining parts by brazing is ideal for induction heating—an application of this new magic process which can slash product costs by doubling and redoubling production rates! Here's how A-C's Electronic Heater solved the problems of one lubricator manufacturer who formed sub-assemblies by torch-brazing. His rejects were high, his production was slow (15-20 units per hour), and slow heat affected cadmium plating on parts so that it peeled off in a short time. A-C's Electronic Heater was able to step production up to 200 units per hour! Rejects became negligible, and plating was not affected. Maybe Allis-Chalmers Electronic Heater can show you the same spectacular results!

MORE EFFICIENT HARDENING

Allis-Chalmers Electronic Heater gives you surface hardening to controlled depths — faster, cleaner, without heat, fumes, space-waste of conventional methods. Tendency of high-frequency currents (400,000 cycles and up) is to hug surface of conductor. Result: thin, hardened surface with healthy, ductile core — as shown above, left, in unretouched microphotograph section of 3/4 inch bar of SAE 1045 steel — hardened by Electronic Heater. Compare this with microphotograph section of 3/4 inch SAE 1045 steel bar hardened by conventional methods — above, right! Here, uncontrolled hardening has penetrated deep into the core, making the bar brittle and weak.

Chalmers

TS WISCONSIN



PRODUCTION

When production overbalances distribution, when we fail to distribute what we can produce, production is throttled, jobs are fewer, standards of living decline,

WE CAN MAKE ANYTHING
...We Must Sell All of
Everything We Make

For a long time we in America have derived great comfort and assurance from the knowledge that we have the industrial ability to produce anything we may need or want. We have tied our wagon to the bright star of producing more products at higher wages to sell at lower prices.

This concept of production has brought us the largest expansion in a standard of living of any people in history.

But, while we have always been able to make anything, we have not always been able to sell all of everything we could make. We have not devoted the same enterprising energy to expanding distribution that we have to production. So, in the past, for immediate short swing relief we have resorted to government imposed restrictions on production and distribution. This expedient did not bring worth-while relief, for in the end it added up to fewer jobs, less production—higher prices.

If commerce and industry will use its inspirational ability and ingenuity to find better, cheaper methods of distribution per unit our goal of full employment may easily be accomplished and we can return to the enviable position of enjoying an expanding standard of living.

MICROMATIC HONE CORPORATION DETROIT 4, MICHIGAN



While cost is a secondary consideration in distribution of war materials, other needs parallel peacetime distribution. Lighter, more easily operated equipment—higher pay loads—easier maintenance, and less of it—are all vital. Micromatic Honing machines have helped wartime distribution to these goals—will do the same for industry after the war. At the same time they will help lower initial and operating costs of distribution machinery—lower costs of goods delivered.

MODEL 705

VERTICAL HYDROHONER

Micromatic Model 705 Multiple Spindle Vertical Hydrohoner has built-in automatic Microsize Control which gauges work automatically—holds within tolerance of .0001" for geometric accuracy and .0003" for uniform diameter size—automatically stops honing cycle when correct size is reached. For internal honing or bores ¼" to 2" diameter. Rotary indexing work fixture provides high production. Usually recommended for maximum stock removal ranging from .0005" to .0015" on hardened parts—.001" to .010"

on soft or medium hard. (Illustrated above, left).

Precision sphericity without measurable error is generated on ball studs by the Micromatic Ball Stud Honer.

Removes .030" stock on diameter from turned heat treated forgings.

Precision honing of long pieces—external or internal—is the work of the Micromatic Harizontal Floor Type Honer. Either hydraulic or manual control or tools. Set-ups available to generate either cross-hatch or co-directional finish patterns.

MODEL 702 Single Spindle

Type HYDROHONER

Single Spindle Type Micromatic Hydrohoner Model 702 for rapid production honing of bores or cylindrical surfaces up to 2" in diameter. (Illustrated above, right).

Silver plated bearings are production honed on a Micromatic Horizontal. Costs were reduced 50% from previous methods.

MICROMATIC HONE CORPORATION

DETROIT 4, MICHIGAN

DISTRICT OFFICES: A14 Empire Suitaire, 700 South Main Street, Rockford, Handle

129 Church Smoot, New Haven 10, Connecticut 1031 South Brisadevar, Los Angeley 15, California

MAKERS OF HONING MACHINE TOOLS

What's on your drawing

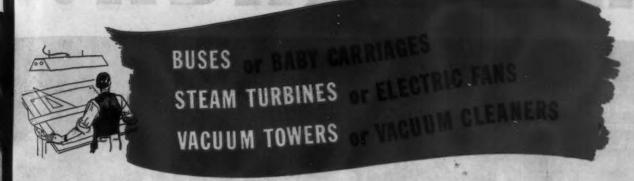








boards for tomorrow?



remember - 9 TIMES OUT OF 10 STEEL WILL DO IT BETTER

WITH most of the advantages of steel, product designers are well familiar. But it should be kept in mind that steel's potentialities for the future have, during these war years, been greatly enhanced.

New, finer steels have been developed. Steel producing and processing techniques have been improved. Faster and more efficient methods of applying steel have been discovered.

New uses for steel—either alone or in combination with other materials—have been turned up and proved practicable.

and proved practicable.

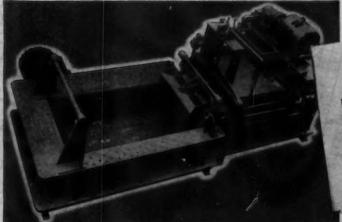
To help you in taking full advantage of the many desirable properties that steel can contribute to your postwar product—that will make it more durable, more efficient, less costly to manufacture and easier to sell—the nation's largest organization of specialists in steel is ready to assist you.

CARNEGIE-ILLINOIS STEEL CORPORATION

Pittsburgh and Chicago

Columbia Steel Company, San Francisco, Pacific Chase Distributors. United States Steel Supply Company, Chicago, Was don't Distributors. United States Steel Export Company, New York





Pesistance to abrasion and wear?

Designers have found U-S-S Abrasion Resisting Steel ideal for the wearing parts of mine equipment, ditching machinery, dredges, frinding mills and quarry equipment. This opecially developed steel is law in cost. It will greatly prolond life wherever grinding, scraping and prolond life wherever grinding, scraping in gritty conditions wear out next magnitude in seasoibilities.

UNITED STATES STEEL

RESEARCH.

These moisture absorption tests in continuous operation since 1930, are augmented by, samples of each new standard insulation which comes into the picture.

BY DECADES

Preparedness for Post-War Industry Developments based on cumulative data long in preparation

In the comparison of rubber insulating compounds and the new synthetics, it is easy and hazardous to jump at conclusions. Through the years, General Cable has been broadening its base of data by which to predict with some assurance the performance to be expected of the new materials. And out of practical experience, it recognizes, too, that there is no substitute for time in the determination of the industry's final answers.

These and other tests, extending over years of simulated service conditions, prepare General Cable to furnish synthetic insulations for all operating conditions.

GENERAL CABLE CORPORATION



LABORATORY

General Cable Corporation Sales Offices are located at Atlanta, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Detroit, Houston, Kansas City (Mo.), Los Angeles, New York, Philadelphia, Pittsburgh, Rome (N.Y.), St. Louis, San Francisco, Seattle, Washington (D. C.)



these Westinghouse motors will run
twenty-four hours a day—
for five years or more—
with no greasing

GOODBYE GREASEBALL SEEYOU IN 1950 OR CATEA

Stanless tree can be standed by the standed of the color of the color

THE BIGGEST ITEM

Another great step forward in the design of squirrel-cage motors of 15 horsepower and under (frames 326 and smaller) is being offered by Westinghouse. It's the Prelubricated Ball Bearing.

Instead of the periodical lubrication required by the bearings in conventional motors, the lubrication of these bearings can be forgotten for five years or more, even when operating 24 hours a day. The saving in time of maintenance crews is obvious, but there are other important advantages, too:

No overgreasing
No "skipped" bearings
No grease contamination
No grease seepage
No unreplaced pipe plugs

All these add up to longer bearing life and smoother motor operation through years of continuous service. For complete information, write for Bulletin B-3554 and Descriptive Bulletins 3100-CSP and 3100-1 to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

J-21342



WESTINGHOUSE SPECIAL FEATURES

- PRELUBRICATED SEALED BALL BEARINGS reduce lubrication maintenance . . . assure longer grease life . . . eliminate extensive lubrication records.
- . IMPROVED TUFFERNELL INSULATION.
- . DYNAMICALLY BALANCED ROTOR.
- DIE-CAST ROTOR with over-size fan.



Westinghouse
PLANTS IN 25 CITIES ... 9 OFFICES EVERYWHERE

WESTINGHOUSE SQUIRREL-CAGE MOTORS

tainless Steel Is Easily Spun

Stainless steel can be spun into a variety of shapes...from small surgical basins to the large covers for bottling machinery pictured below. It can also be fabricated by almost all the other common methods, including deep drawing, forging, and most types of welding.

Bottling plants, petroleum refineries, textile mills, and many other process industries have long used stainless steel, not only because it can be fabricated into many forms, but because it is resistant to corrosion and heat, and is easy to clean.

BUY UNITED STATES WAR BONDS AND STAMPS





Fills the gap between cutting oils and soluble oils

STANICOOL HD



• Do you find that on certain machining operations neither cutting oils nor soluble oils do a satisfactory job? Do you find that cutting oils lack the cooling quality needed and that soluble oil gives short tool life or poor finish?

There's where Stanicool HD may help you. It is used in a water-and-oil emulsion; therefore it gives effective cooling. But it is especially fortified to reduce welding between tool and work—to give longer tool life and better finish than

conventional soluble oil. It has speeded up many wartime jobs.

A Standard Cutting Oil Specialist will be glad to consult with you on your cutting oil problems. Stanicool HD or some of our other new wardeveloped products may be just what you need to help reduce production cost on your post-war products. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois, for the Cutting Oil Specialist near you.

Buy and hold more Victory Bonds

STANDARD OIL COMPANY (INDIANA)



It's as easy as matching pennies

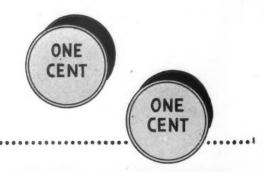
to get the <u>right</u> lubricant in the <u>right</u> places with Standard's



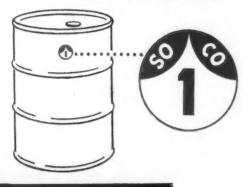
• WITH Standard's Coded Lubrication, lubricants are handled from the drums or storage containers to oil cans or grease guns to the oil cups or grease fittings on equipment—by simple code numbers to identify them. It's easy to see how this eliminates the confusion of brand names and grades which your oiler must know—how it reduces the possibility of errors and the misapplication of lubricants which may result in damaged equipment or in applying expensive lubricants where they are not needed.

To install this system, you assign numbers to the lubricants used in your plant. Standard Oil will supply the numbered decals to be applied to the containers and lubricating spots. Now, when reconversion is in full swing, is a good time to plan on better, cost-saving lubrication.

A Standard Oil Lubrication Engineer will be glad to give you further information or consult with your lubricating men in the application of Coded Lubrication in your plant. This offer is available to all plants in the Middle West. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

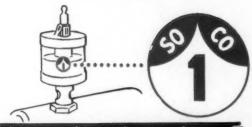


From storage container.



to oil can...





by matching the numbers

Buy and hold more Victory Bonds

STANDARD OIL COMPANY (INDIANA)



"I didn't know you could weld aluminum!"

Strange, how often you still hear that exclamation. Gas welding, spot, butt, seam and electric are welding, furnace, torch and dip brazing all figured importantly in war work. You'll find experienced operators everywhere.

These joining methods, coupled with the many economic advantages offered by Alcoa Aluminum products, will help determine the winners in the battles for postwar markets.

Alcoa has a book which discusses in detail all of these methods—"WELDING and BRAZING ALCOA ALUMINUM"—helpful for your product designers and plant men. For a free copy, write ALUMINUM COMPANY OF AMERICA, 2185 Gulf Building, Pittsburgh 19, Pennsylvania.



ALCOA ALUMINUM



whiteen operations

Contour turning and boring this of millions of pieces demands exact cream separator stem cover, and the stem itself, take only two operations for each piece, on the Monarch Magnamatic. Previous methods required 20 operations per piece.

In use, the stem and cover assembly rotates at 7000 rpm, so balance must be perfect to prevent wrecking the mechanism. Extreme thinness of walls (maximum 1/8") calls for delicate precision. Complete interchangeability

uniformity. All these are met with the Monarch Magnamatic.

This job illustrates how, with modern tools, mass production methods can be applied to the most difficult jobs, to reduce prices and thus enlarge markets. Our engineers will gladly work with you to help you cut your costs and improve your production with Monarch turning machines.

THE MONARCH MACHINE TOOL COMPANY . SIDNEY, OHIO

FACTORY BRANCHES

CHICAGO 6, ILLINOIS 622 W. Washington Bivd. Phone: Randolph 4295 CLEVELAND 6, OHIO Room 209 Upper Carnegie Bldg. 10465 Carnegie Avenue Phone: Garfield 2590

DETROIT 2, MICHIGAN Fisher Building e: Trinity 1-0426 INDIANAPOLIS, INDIANA Maco Building 38 and College Avenue Phone: Wabash 2650

Representatives in Principal Cities

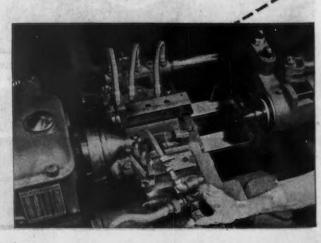
NEWARK 2, NEW JERSEY 635 Industrial Office Bldg Phone: Mitchell 2-1770 PITTSBURGH 22, PENNSYLVANIA 512 Empire Building

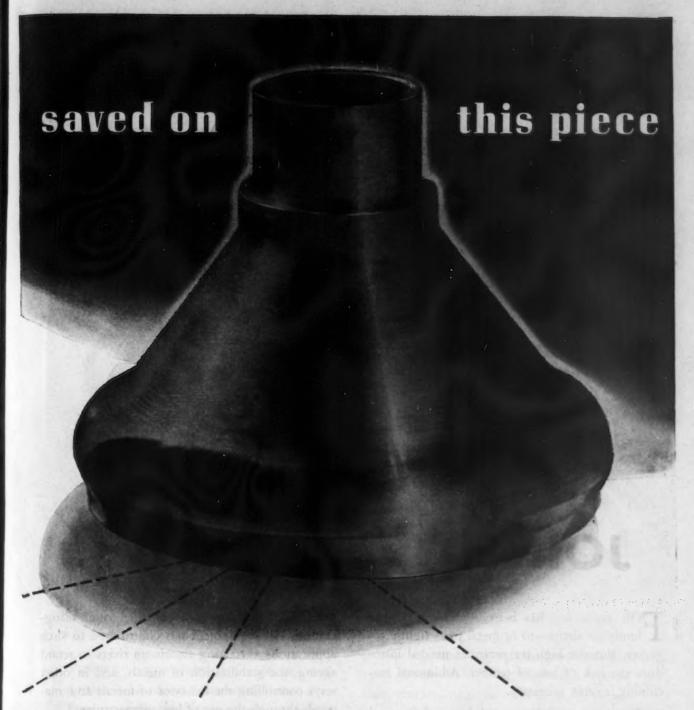
. WITH A SIMPLE TEMPLATE

The cutting tool automatically and accurately follows the contour of the thin metal template, to produce two or two million parts with equal accuracy. Template can be stored and used again at any time, and resulting parts will be perfect duplicates of the original run.

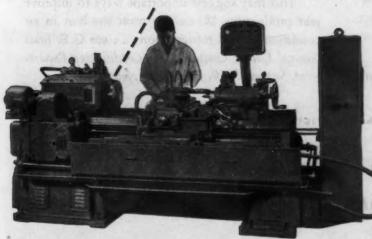
Only one setup is required for each of the operations of contour turning the outsides of the two pieces, and contour boring the insides. Once the setup is made, the operator need only insert and remove the workpiece - and can readily attend two or more machines. Setup time from one job to another takes from 10 to 30 minutes, faster than on any other turning machine in the world.

AND SETUP LIKE THIS



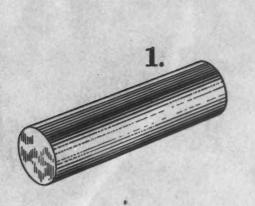


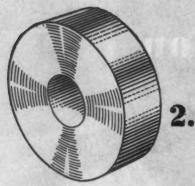
... ON A MONARCH MAGNAMATIC!

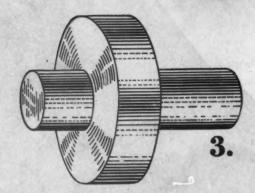


This turning machine is fully automatic, all electrically controlled. Six different feed rates can be automatically selected, depending upon depth of cut and finish required. One button on control panel starts the complete operating cycle. An endless variety of turning, boring and facing work can be done on this improved Magnamatic.

Monarch Saves Time







JOINED... by degrees!

FOR years, heat has been used to set collars firmly on shafts—to fit metal parts tightly together. But the high temperatures needed introduce the risk of loss of temper. Additional machining is often necessary.

Now cold does the same job . . . faster and better! Low temperatures, to minus 50—100F., cool and contract the inner part. When in place, room temperature secures a final fit. In this way, too, both parts are joined . . . by degrees!

Here is one of the many better, more economi-

cal industrial processes developed through refrigeration. G-E equipment has contributed to such applications as treating aluminum rivets to retard ageing, the stabilization of metals, and in other ways controlling the behavior of metals and materials through the use of low temperatures.

This may suggest important ways to improve your production. When you want the best in air conditioning and refrigeration . . . see G.E. first! General Electric Company, Air Conditioning Department, Section 53910, Bloomfield, New Jersey.

BUY ... and hold ... VICTORY BONDS

GENERAL E ELECTRIC

Industrial Refrigeration



VIBRATION or continual movement in a connection is bound to cause trouble sooner or later . . . unless the connection is *engineered* for the job.

Illustrated are a few American Flexible Metal Hose and Seamless Tubing assemblies, each of which is designed to meet a specific set of conditions.

Such a connection can be developed for you... with the necessary resistance to pressure, temperature, chemical or abrasive action and mechanical stress.

For detailed information on the range of types and sizes of "American" products, write for Publication SS-50. Manufacturers, engineers and machine designers alike will find it a thoroughly practical guide.

BUY WAR BONDS . Buy all you can . Keep all you buy



American Metal Hose

AMERICAN METAL HOSE BRANCH OF THE AMERICAN BRASS COMPANY · General Offices: Waterbury 88, Conn.

Subsidiary of Anaconda Copper Mining Company · In Canada: ANACONDA AMERICAN BRASS LTD., New Toronto, Ont.

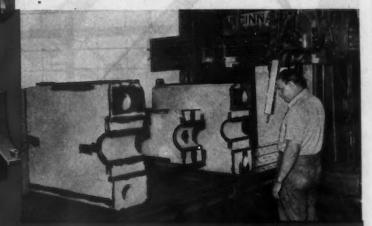
THE IRON AGE, October 4, 1945-25

MODERN PRECISION WELDMENTS

TEAVY STUFF"!

Modern large-scale precision weldments, made possible by advanced techniques developed during the war, are already proving highly advantageous in the heavy machinery industries. Special weldments, designed, fabricated and finished at Warren City, are replacing steel castings in many important applications. In the Bliss Enclosed Press shown here, the crowns, beds and slides are now Warren City weldments, saving weight and increasing strength. High precision is assured by accurate normalizing, stress relieving, machining and testing, with the finest and most modern scientific methods and equipment.

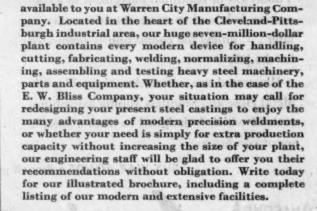
Finishing a precision-tested Bliss press crown, fabricated from welded steel plates at Warren City



WELDMENTS SAVE WEIGHT, ADD STRENGTH, IN FAMOUS BLISS INDUSTRIAL PRESSES

Eliminate Pattern Costs and Casting Defects!

IF YOUR PROBLEM involves the use of heavy steel castings or weldments, be sure you don't overlook the unusual production facilities and know-how

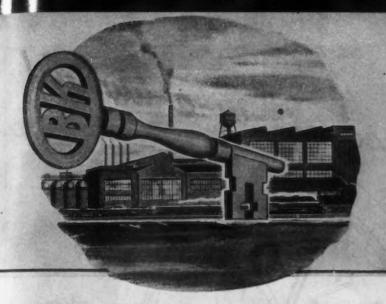




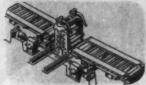
WARREN CITY MANUFACTURING COMPANY ***

DEPARTMENT C WARREN, OHIO

Wholly Owned Subsidiary of GRAHAM-PAIGE MOTORS CORPORATION



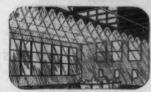
The Key Called "KNOW-HOW!"



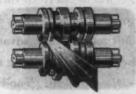
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I unlocks many doors . . . solves many a pressing problem. You may have the key yourself. But, if not . . .

... consider Blaw-Knox. Think of its engineering skills accumulated through years of peace and war, its vastly "stepped-up" resources of experience, knowledge and production facilities. The listing under the various Divisions of Blaw-Knox shown here represents but a small fraction of Blaw-Knox products and services. But it does hint at specialized knowledge in many fields, at research and laboratory facilities, at modern plants, equipment and methods . . . at an engineering background of great breadth and scope.

If what Blaw-Knox has to offer lies within your range, it may well help to provide the answers you need—the hedge you need—against future uncertainties. We ask for an opportunity to discuss this with you.

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MECHANICAL SPRINGS

SMALL STAMPINGS .

YOU CAN SAVE TIME today by placing the design and production of springs for your mechanisms in the capable hands of B-G-R engineers. They will recommend the proper material and type of action best suited to the performance desired . . . based on experience covering thousands of widely varying conditions of use.

At both B-G-R plants, springmaking equipment . . . still hot from war schedules . . . will be ready to turn out springs in any amount your production lines need. Time is a real factor in product shift today. Take advantage of this opportunity to unload troublesome spring needs by letting B-G-R shoulder the problem. You'll find it saves time . . . and often needless expense.



A CONDENSED HANDBOOK FOR THE ENGINEER AND LAYMAN . FIRST EDITION .

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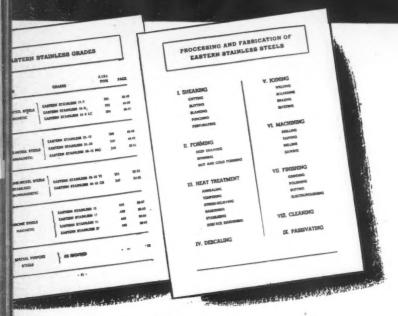
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EASTERN STAINLESS STEEL SHEETS

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THE NEW HANDBOOK BY EASTERN STAINLESS STEEL!



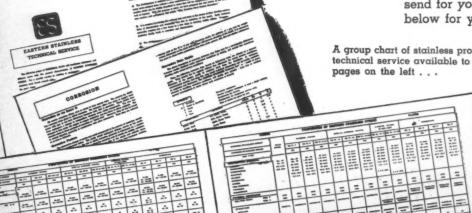
hese two sub-indices give you an idea of what it will be worth to you to have this book handy on your desk. Have you ever seen any compilation of facts on stainless o complete—so well organized?

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EASTERN for the answer STAINLESS is the question



NEW DESIGN OR NEW PRODUCT in the making? Roebling offers just the right steel for your machines and methods . . . meeting the job requirements all the way.

Uniform Roebling high quality is assured by precision control all along the line of processing. Identical physical properties are achieved in coil after coil by careful chemical analysis . . . by remarkably accurate annealing and tempering methods.

Perhaps you've a tough fabricating problem with strip steel. Roebling cold rolled strip comes to you with the workability and finishability your product requires. It will feed through forming, punching or stamping presses without hitch or halt . . . without damage to dies. And its smooth rolled surface

comes in several time-saving finishes.

Round and shaped wires have the same dependable uniformity and dimensional accuracy. In strength and spring, in finish and formability, you'll find them meeting exacting specifications.

Call in a Roebling engineer for advice and help in making the proper selection. Or send a generous sample of what you require . . . we'll duplicate it exactly. Roebling steel products are being made available by eased restrictions . . . write our nearest branch for details.

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PACEMAKER IN WIRE PRODUCTS

THE IRON AGE, October 4, 1945-31



Whatever is made from this powdered metal will have the advantages of lowered cost, and high precision at mass rates of production.

We don't know what it is, either!

That's up to you!

Maybe you want to replace an expensive forging or casting.

Or perhaps you want a small gear. One that's fairly intricate—intricate enough to create plenty of headaches in the machining with consequent production down time.

We can make both of those with that pile of powdered metal up there. We can make them quicker—cheaper.

We've made contacts, electrodes, armatures, ordnance parts, pole pieces, sprockets, cams,

and many other items this way. Most have been turned out at production rates unobtainable by any other method.

And although we've been doing this (and this exclusively) ever since powder metallurgy got under way, our research and engineering departments have scarcely begun to find all the places where *Sinteel* will do a better, faster, cheaper job.

If you use parts let us look at them. Maybe that mound of metal powder can be your present part made cheaper and better. (And if it can't, we'll tell you that too!)

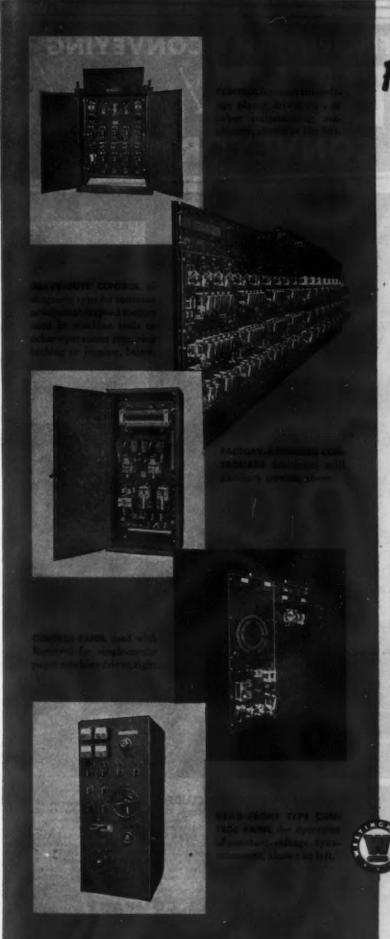
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American Electro Metal Corporation

YONKERS 2, NEW YORK

Offices in Chicago, Dayton and Detroit





For any D.C Control

A MOTOR STARTER OR COMPLETE MILL CONTROL

Check Westinghouse

You may never need these specialized controllers shown on this page—for cranes, planers or paper machines—but the same excellence in engineering, design and manufacture goes into every Westinghouse control device. Should your particular problem require special help, call a Westinghouse engineer to review your requirements and make the necessary recommendations.

Westinghouse motor control covers the entire range of standard a-c and d-c controls and accessories for every type of drive, plus many specialized types of control shown here. For help on any control problem, it pays to first call Westinghouse. Or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.



Send for this booklet

The entire range of Westinghouse standard motor control is covered in this 290-page Buying Data Book. If you do not have a copy, phone your Westinghouse office for Catalog No. 7000.

Westinghouse
PLANTS IN 25 CITIES ... O OFFICES EVERYWHERE

Motor Control

THE IRON AGE, October 4, 1945-33

THE "ROAD" to EFFICIENT BELT CONVEYING

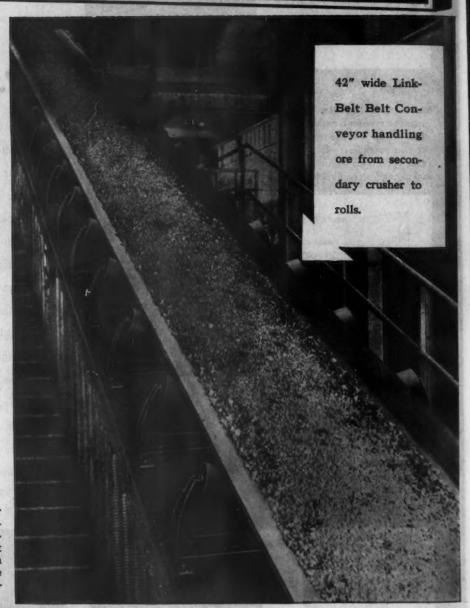
BELT CONVEYOR IDLERS

• Top performance in belt conveyors depends, in a great measure, upon the structure on which the load moves. So, begin at the beginning and make sure you select the right type. Link-Belt Roller Bearing Belt Conveyor Idlers are the outgrowth of almost 50 years of constant development. Engineering development that has kept pace with growing service needs, has achieved outstanding design in today's Link-Belt Idlers.

There are good reasons why they perform with minimum power and maintenance operate smoothly and dependably, and add to the ordinary life of the conveyor belt. Catalog sent on request.

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Assure longer life to conveyor belts by using Link-Belt Self-Aligning Idlers. They automatically maintain the conveyor belt in a central carrying position without injury to its edges. Made in two types for regular or reversing travel.



LINK-BELT PRODUCTS INCLUDE: Conveyors and Elevators of all types—Belt, Apron, Pan, Bucket, Chain, Bulk-Flo, Sidekar-Karrier, Oscillating-Trough, Flight, Screw, etc. . . Feeders . . . Vibrating Screens . . . Skip Hoists . . Car Spotters . . . Silent and Roller Chain Drives . . . Speed Reducers . . . P.I.V. Gear Variable Speed Changers . . Chains and Attachments of all types . . Malleable Iron, Promal, and Steel . . Sprockets . . Gears . . Clutches . . Couplings . . Base Plates . . Take-Ups . . . Babbitted, Ball and Roller Bearings . . Grease Cups . . Safety Collars . . . Shafting, etc.—everything from one source to make your materials handling and power transmission machinery operate at peak efficiency. Send for Catalogs.

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SAYS THE MAN IN THE HELMET-

My first choice for any welding job is one of these swell

AIRCO ELECTRODES.

They're easy to use and they do a grand job. 99

PHAT in brief is the reason why so many welders prefer Airco Electrodes for every welding job. For, in addition to meeting the metallurgical and mechanical requirements of each specific job, Airco Electrodes have those easy-working features that enable the welding operator to meet output schedules consistently.

After exacting laboratory trials each new Airco electrode is thoroughly pretested for working ease and efficiency by welding operators of varying skill and experience. Their suggestions, incorporated into the final product, assure an electrode that will rate high with the vast majority of operators.

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-which gives detailed information on Airco's complete line of shielded arc electrodes for every welding job. Address your local Airco office or Dept. I A. Air Reduction, General Offices: 60 East 42nd Street, New York 17, N. Y. In Texas: Magnolia Airco Gas Products Co., General Offices: Houston 1, Texas.



AIR REDUCTION



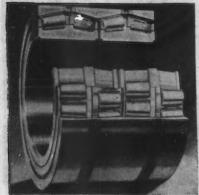
Weld with

ELECTRODES FOR BETTER WELDS

THE IRON AGE, October 4, 1945-35

FOR MORE OUTPUT, LESS MAINTENANCE SPECIFY TORRINGTON BEARINGS

With the trend in steel mills toward speedier production at lower cost, comes the demand for equipment that "rolls it out" faster with fewer and shorter shutdowns for maintenance. Shown on this page are some typical steel mill applications of Torrington Bearings. Designing and building to specific requirements has for years been a function of Torrington's Bantam Bearings Division. Our engineers will gladly help yours to incorporate Torrington Bearing advantages into your present or future designs.



HIGHER ROLL NECK SPEEDS

and maximum service life are attained by use of Torrington Tapered Roller Bearings. Four-row taper type bearing shown here is used on the roll necks of Mesta five-stand mill delivering 3200 feet of cold strip per minute. Bore is 12 inches; O.D. is 171/4 inches. These bearings handle loads efficiently, assure long and trouble-free service life.

PEAK TONNAGE RECORDS

come easier when Torrington Two-Row Tapered Roller Bearings made of S.A.E.-3310 steel (with higher nickel content) carry the thrust loads imposed on back-up rolls. Bearing shown here, designed for 80" four-high continuous hot strip mill, has thrust load capacity of 220,900 pounds at 100 r.p.m. Features include simplicity of design for positioning in housing; controlled lubrication; clearance adjustment to permit assembly as received; and take up as required, with spacer width control.



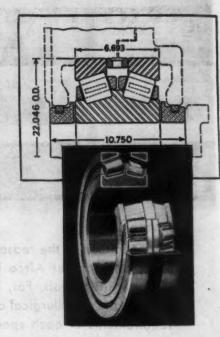
MORE ACCURACY

is attained when Torrington Radial Roller Bearings are used in flying shears. Bearing shown here is built to take the around-theclock punishment imposed by high speed operation of a modern strip steel cutter and to provide the necessary accuracy in shearing so that edges are clean and lengths are cut within specified tolerances.

LESS MAINTENANCE ATTENTION I

is needed when screw downs turn on Torrington Roller Thrust Bearings. Bearing shown here is used on four-high screw downs. Specifically designed to handle tremendous loads at high speeds, it helps the mill deliver more work for less power...stay on the job longer with less interruption...give more years of dependable, trouble-free service.

THE TORRINGTON COMPANY . BANTAM BEARINGS DIVISION SOUTH BEND 21, INDIANA



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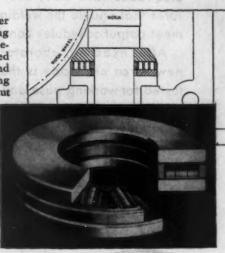
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TORRINGTON BEARI

STRAIGHT ROLLER . TAPERED ROLLER .

A delicate operation: Burring the steel teeth of an aircraft engine gear to remove all sharp edges which might become starting points for failure-inviting "fatigue cracks."

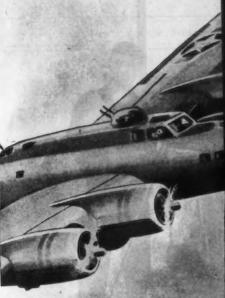




Photo Courtesy Wright Aeronautical Corporation

Steel Teeth FOR 2200 HORSES

They're the teeth on the reduction driving gear which transmits from crankshaft to propeller some 2200 horsepower of a roaring aircraft engine.

Tremendous strain upon each tooth demands exceptional strength. High speed of operation requires unvarying hardness to resist wear. But most important is the need for jewel-like precision—because a variation of only half a thousandth of an inch can double the stresses in a single tooth, or result in noisy gearing and a dangerous drop in power.

For these reasons, aircraft engine gears are made from the finest of steels—electric furnace steel—a majority of which comes from Republic furnaces.

Republic Electric Furnace Steels are "targeted steels" — processed to hit narrow specification marks for chemical, physical, hardenability and performance values with unfailing accuracy. They are as CLEAN, SOUND

and HOMOGENEOUS as steel can be made—free from hidden imperfections which at final inspection could destroy all the costly craftsmanship of the 69 operations required to produce the particular gear pictured above. And their consistent UNI-FORMITY—their freedom from practice-upsetting variables—insures maximum benefits from mass production methods.

Your peacetime products may not present the same problems as aircraft

gears—but they will involve performance, cost and salability, which are highly important to you. And right there is sufficient reason why you should investigate Republic Electric Furnace Steels. A Republic metallurgist is ready NOW to tell you what they can do for you. Write us.

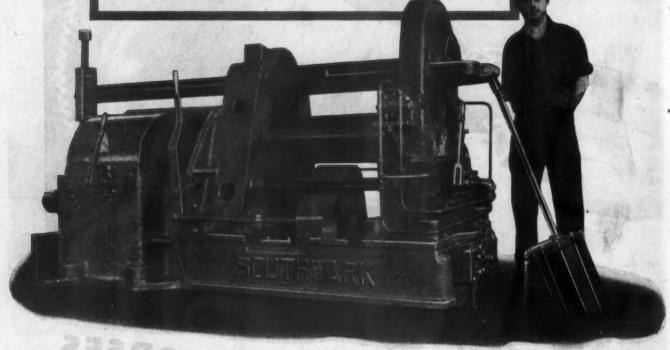
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REPUBLIC

ELECTRIC FURNACE STEELS

Baldwin's small bending rolls
duplicate the quality
of Baldwin's largest



PYRAMID-TYPE BENDING ROLL

with drop end

Fine engineering and high quality built a worldwide reputation for long service under heavy use for Baldwin large bending rolls. These essentials are duplicated throughout in this smaller model.

SPECIFICATIONS: (No. 3642-2)

Capacity: 11/4" plate x 30" long.

Top Roll Diameter: 7"
Bottom Rolls: 10½"

Minimum inside diameter of rolled plate: 713/6"
Main Motor: 40 HP at 1200 RPM.

Screw-Down Motor: 15 HP at 900 RPM.

If you are thinking of a small bending roll for your shop, ask for details on this production-booster. The Baldwin Locomotive Works, Baldwin Southwark Division, Philadelphia 42, Pa., U. S. A. Offices: Philadelphia, New York, Boston, Chicago, St. Louis, Washington, San Francisco, Detroit, Cleveland, Houston, Pittsburgh.

other Baldwin Products: Hydraulic presses, Testing equipment, Steel forgings and castings, Diesel-electric locomotives, Diesel engines, Metal plate fabrication, Rolled steel rings, Bronze castings, Heavy machine work, Crane wheels, Bending rolls, Plate planers, Babbitt metal, Alloy iron castings, Briquetting presses.



BALDWIN

SOUTHWARK ENDING ROLLS

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COPPER ALLOY BULLETIN

REPORTING NEWS AND TECHNICAL DEVELOPMENTS OF COPPER AND COPPER-BASE ALLOYS

Prepared Each Month by the Bridgeport Brass Co. "Bridgeport" Headquarters for BRASS, BRONZE and COPPER

Now is the Time to Modernize **Metal Specifications**

During the months ahead industry is faced by tremendous problems. Thousands of factories must reconvert for peacetime production to meet the greatest demand for goods in the history of our country. Obsolete or worn out machinery must be discarded and new equipment installed. Whenever necessary, methods must be brought up to date and improved. Metal specifications must be subjected to the most searching examination to determine whether the best possible material is being used. Engineers and designers must bring themselves up to date by finding out what new alloys have become available, what improvements have been made in existing alloys and the engineering properties of these modern alloys.

Requirements are more severe, and the demand is for materials capable of taking more punishment. The war period has acted as a proving ground. Restrictions in materials and labor necessitated the use of machines and equipment beyond their rated capacities. Both design and materials either proved themselves or fell by the wayside. In many cases new materials, some of which may have been intended for substitute purposes, proved superior to long-established metals and alloys. Today engineers are setting higher standards for both design and material specifications.

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Progress in Copper-Base Alloys

The non-rusting properties, workability and other fine characteristics of copperbase alloys have been known for generations. However, it may not be generally realized to what extent copper-base alloys have been endowed with the engineering properties of dependability, high strength, exceptional resistance to wear and corrosion, and high fatigue resistance. As a result of this progress new horizons have been opened for brasses and bronzes and their usefulness greatly extended into wider

Wide Range of Alloys Available

No longer must engineers or designers choose rustable material simply because high strength is required or put up with moderate strength because workability is necessary. Through metallurgical research and advances in processing methods and equipment, a wide range of engineering copper-base alloys is available to help manufacturers produce a dependable, uniform product at a price which will permit reasonable profits.

Bridgeport has much to offer not only from the standpoint of modern engineering alloys such as the Duronzes, cupro nickel and improved phosphor bronzes, but also a complete line of quality brass mill products for the thousands of applications which they can fill best.

Bridgeport Brass Technical Handbook

To bring the design engineer, metallurgist, and purchasing agent up to date on the various copper-base alloys that are available; their physical, chemical and mechanical properties; and the specifications which apply to them Bridgeport Brass Company has published a 128-page technical handbook which is soon to be released to the trade.



The technical handbook deals briefly with general information such as the useful properties which have made copper-base alloys a part and parcel of modern civilization; the results of current research and development and the new engineering alloys that are available. Also included is the copper-zinc alloy system and the effect of additional elements such as lead, tin, aluminum, silicon, iron, nickel, arsenic, etc. on the properties of copper-base alloys. The effect of annealing and cold working on the microstructure and physical properties of brass is discussed. The tempers of rolled flat products and drawn tubing are explained in detail and should be very helpful in understanding metal specifications. The causes and prevention of stress corrosion cracking and hot breaks are also included.

Since lubricants have an important bearing on metal working, space is devoted to the various types and characteristics of lubricants used for blanking, cupping, drawing, forming and machining. A chapter on metal cleaning discusses solvent cleaning, degreasing, alkaline scouring, emulsion scrubbing, electrolytic cleaning and tarnish removal. The most common acid cleaning formulae are also given. A brief discussion of drawing tools for sheet metal is included.

For simplification and easier understanding alloys have been grouped on the basis of their application. In the strip and sheet section, for example, we have nine alloys ranging from high brass to oxygen-free copper, which are suitable for drawing, spinning and stamping. Each of these alloys is briefly described as to composition, special characteristics and applications. This is followed by a table which shows seven of these alloys side by side. The table gives the complete analysis, mechanical properties such as tensile strength, yield strength, elongation and Rockwell hardness; physical constants such as melting point, density, coefficient of thermal expansion, thermal and electrical conductivities and modulus of elasticity. Under fabrication properties are given machinability ratings, cold and hot working characteristics and hot working range. Also included are the specification numbers such as ASTM, Federal, Navy, etc. to which these materials belong.

Other groups of alloys under the strip and sheet section are engineering alloys for drawing, spinning and stamping, leaded brass strip, corrosion resisting tin brasses and spring metals.

In the rod and wire section the alloys are grouped under headings such as rod and tubing for screw machine operation; rod and wire for cold heading, rods for hot forging and welding rod. Tables similar to those under the strip and sheet section have been compiled with each group of alloys.

In the section devoted to tubing, the various methods for processing tubing are described and illustrated. The various alloys have been grouped under headings such as tubing for fabrication, condenser and heat exchanger tubing, duplex tubing, brass and copper pipe and copper water tubing.

To make this handbook still more useful numerous tables showing comparison of wire gauges, fractions of an inch, temperature conversions and weights of strip, circles, rod, wire and tubing and similar data have been included.

Our object is to distribute this handbook widely among purchasing agents, engineers, designers, metallurgists and chemists, who are active in the non-ferrous metal working field. Requests should be made on company stationery.

COPPER ALLOY BULLETIN

CAUSES OF CORROSION

This article is one of a series of discussions by C. L. Bulow, research chemist of the Bridgeport Brass Company.

CREVICE CORROSION-PART 3

In the last two articles on causes of corrosion we discussed the mechanism of crevice corrosion and listed typical examples. Crevice corrosion occurs in those spaces formed by particles resting on metal surfaces, threaded connections, nails driven into wood, points of contact, corners, mechanical joints, etc. We shall now consider in greater detail various procedures which have been used to eliminate crevices or to prevent a corrosive liquid from getting into the crevice. Some of the problems connected with crevice corrosion have not yet been solved. It is hoped that this discussion will suggest means of overcoming these difficulties.

Prevention of Crevice Corrosion

A brief description of a few methods which have been used to overcome crevice corrosion follows:

1. Wire screens, filters and settling tanks are intended to prevent foreign material from settling out on metal surfaces.

2. Plastic, rubber or metal sleeves which are either permanent or can be periodically replaced will protect metal tie rods and bolts touching wood and passing through wood in vinegar and pickling tanks.

3. A substantial increase in metal thickness or the use of a plastic or metal sleeve in critical areas of cables, sheathes and piping resting on moist duct walls and planking may materially lengthen the time before failure occurs.

4. Heavy, viscous, tacky material such as tar-like substances, have been used to eliminate the crevice between metal roofing and wood. Also, changes in design may prevent the retention of water between the roofing in contact with wood.

5. Oil with or without corrosion inhibitors is widely used to keep water out of the interior of wire rope, cable and stranded wire. Frequently, it is necessary to resort to the use of more corrosion resistant materials.

6. The most corrosion resistant material usually is resorted to in order to prevent or keep to a minimum crevice corrosion of wire gauze or screen where the wires cross one another. Under some conditions, additional protection can be obtained through the use of paint or lacquer.

7. Heavier sections are installed locally in such structures as tanks and heat exchangers, in order to lengthen the life of the structure. The elimination of crevices through proper design is of great importance. Welded, soldered or filled joints aid in preventing crevice corrosion between piping and fittings, nuts and bolts, etc.

8. Welded, soldered or filled joints have, in many instances, replaced riveted joints. For many applications it has been shown that the weld line corrodes at a rate no greater than that of the plates on each side of it.

Bridgeport's Improved Phosphor Bronze for Longer Lasting Spring Contacts

In such applications as switches, radio and radar equipment, jack plugs, automatic controls and similar parts, more generous use of the finest phosphor bronze available does not appreciably affect the cost of the article, but increases its dependability and service life immeasurably.



Volume control by P. R. Mallory and Co., Inc. Contact arm is made from Bridgeport's Improved Phosphor Bronze.

Illustrated above is a volume control made by P. R. Mallory and Company, Inc., who have this to say concerning the requirements for the spring contact arm:

"Long life, good current carrying characteristics, constant dependable spring pressure and flexibility in plating finishes."

Bridgeport's improved phosphor bronze, when made into properly designed springs can withstand millions of cycles of flexing without failure. It possesses high tensile and yield strengths as well as exceptional corrosion resistance. From the manufacturers' standpoint it is a practical alloy because it can be readily formed into complex shapes. Other applications for Bridgeport's improved spring phosphor bronze are diaphragms, bellows for radiator valves and steam traps, etc. Phosphor bronze is also used for engineering applications such as clutch discs and equipment in paper mills and water works and sewerage plants.

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.

Trolley Safety Tap for trolley-powered equipment consists of copper hook, bronze fuse receptacle inside an insulated handle at the hook end and interior connection to a second similar receptacle for attachment to a cable connector at the outer end. The hook hangs on a trolley line.

New Bearing Assembly employs a porous bronze bushing pressed into a spherical body that is held in a pressed steel, two-piece housing. The bushing holds approximately onethird of its volume in lubricant, supplied by oil cup and wick. The bushing is shouldered on one side to provide a thrust surface. It comes in eight shaft sizes.

Instrument Measures Stiffness of flexible sheet materials to 1/8" thick. Provides initial reading, checks ability of material to sustain deflection, and provides readings in arbitrary units, on which to figure resilience. Maximum range is 0 to 10,000 stiffness units. No. 636

Motor Generator Providing different specified DC voltages from 12 to 2,000 volts is claimed to be light in weight, space saving, and to have fine voltage regulation and to meet low ripple requirements. No. 637

Portable Vacuum and pressure unit for gas or air operates many kinds of apparatus for temporary or test purposes. Handles from one to five cubic feet of air at pressure up to 10 pounds. No. 638

Simultaneous Readings of both amperage and voltage are taken with a new instrument measuring from 0.2 to 500 amps in 8 current ranges, and from 30 to 600 volts in 3 ranges. No. 639

Identical Halves of a new electrical connector slide together in jack-knife fashion and lock in a positive position with a slight No. 640

An Electrically Heated compound kettle complete with motor driven agitator and full automatic controls and electrically heated discharge valve is used for melting transformer compounds, asphalts and resins. No. 641

PRODUCTS OF THE BRIDGEPORT BRASS COMPANY

Executive Offices: BRIDGEPORT 2, CONN.-Branch Offices and Warehouses in Principal Cities

SHEETS, ROLLS, STRIPS— Brass, bronse, copper, Duronse, for stamping, deep drawing, forming and spinning.

CONDENSER, HEAT EX-CHANGER, SUGAR TUBES-For steam surface condensers, heat exchangers, oil refineries, and process

cast iron and steel, fabricating silicon bronze tanks. "Bridgeport

LEDRITE* ROD—For making automatic screw machine products.

PHONO-ELECTRIC* ALLOYS—
High-strength bronze trolley, messenger wire and cable.

BRASS, BRONZE, DURONZE
WIRE—For cap and machine screws, wood screws, rivets, bolts, nuts.

COPPER WATER TUBE.
FABRICATING SERVICE IN THE PROPERTY OF STATEMENT WELDING ROD-For repairing DURONZE ALLOYS-High-

strength silicon bronzes for corrosion-resistant connectors, corrosion-resistant connectors, marine hardware: hot rolled heets for tanks, boilers, heaters, flues, ducts, flashings.

FABRICATING SERVICE DEPT. -Engineering staff.

BRASS AND COPPER PIPE

Note: Bridgeport products are supplied in accordance with exist-ing priority regulations.

Trade name.

BRIDGEPORT



BRASS



CAN YOU SEE YOUR WIFE IN THIS PICTURE?

BACKS bending over the village stream . . . wooden paddles thudding against wet clothes. It's wash day in southern Europe!

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You'd hardly expect to find your wife at a social gathering of this kind at the creek near Main Street! No, she'd rather let a machine handle your shirts and socks. And the machine does it-quicker, easier, better.

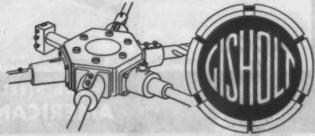
Washing machines weren't invented in this country. They were known in England as long ago as 1782. But, it remained for American manufacturers to produce them in numbers-to popularize them. In two short decades before the war, they put electric washing machines in 13,000,000 homes-and reduced the cost by two-thirds!

Other nations have craftsmen; other nations have materials. But it's your wife who gets the machine to end this drudgery-at a price you can't resist.

It has been Gisholt's privilege to work with many manufacturers of washing machines-providing the tools to machine many parts, and helping to devise more efficient machining methods. You'll find this true in almost every industry where the swift, accurate turning of metals is important to lower manufacturing costs.

GISHOLT MACHINE COMPANY

Madison 3, Wis. 1215 East Washington Ave.



Turret Latines . Automatic Latines . Balancing Machines . Special Machines

PAGE Welding ELECTRODES



PAGE Keeps On MAKING NEWS FOR WELDERS

- Since this time last year, PAGE has made the following announcements to the welding industry:
- A new Hi-Tensile "AF" electrode for welding lightgauge mild steel, using AC or DC.
- A new book about stainless steel electrodes and how to use them for best results.
- 3 A new stainless steel electrode for AC or DC.
- A new book of information on the use of Hi-Tensile
 "AF" electrodes.
- A new pocket-size manual of general information about electrodes and their use.
- A new line of "midget" electrodes for welding very light-gauge mild steel.

Here is tangible evidence that PAGE is keeping up with the times. For uniformly high quality electrodes and for up-to-date information about welding techniques, it will pay you to . . .

Get in touch with Page!



Monessen, Pa., Atlanta, Chicago, Detroit, Denver, Los Angeles, New York, Pittsburgh, Portland, San Francisco, Bridgeport, Conn.



PAGE STEEL AND WIRE DIVISION AMERICAN CHAIN & CABLE

REPUBLIC CHATEAUGAY ... A NATURALLY

...A NATURALLY BETTER PIG IRON —MADE FROM THE WORLD'S FINEST ORES

Yes, Republic CHATEAUGAY Pig Iron is made from the highest grade magnetite, hard rock ores of the Adirondacks—universally recognized as being among the world's finest.

And what does this mean to you, in terms of casting results and production costs? Here are some of the facts:

First: In the casting of large or intricate shapes, CHATEAUGAY fills the molds completely and quickly — sets rapidly. And, regardless of size or shape, you are assured of uniform soundness, close grain structure and uniform cross-section density throughout every casting: Second: CHATEAUGAY castings are inherently strong, tough and resistant to wear. Yet they possess extraordinary machinability, resulting in easier, more economical milling, turning, drilling or other machining operations.

A Republic Pig Iron Metallurgist is ready to tell you the full story of Chateaugay, and the way in which it can increase your productive output. Just let us know when you would like to see him.

REPUBLIC STEEL CORPORATION
GENERAL OFFICES CLEVELAND 1, OHIO
Export Department: Chrysler Bldg., New York 17, N.Y.

Couble PIG IRON

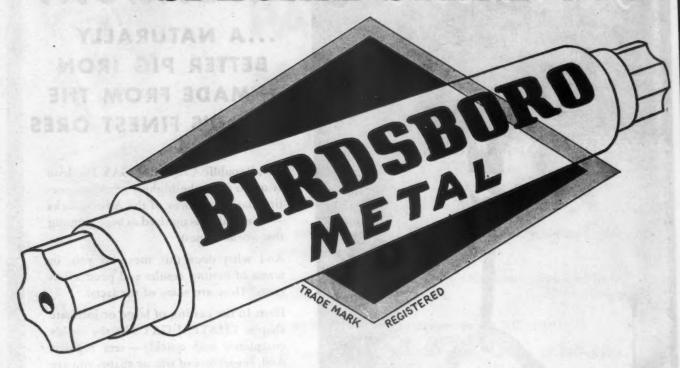
CHATEAUGAY"
Low Phosphorus,
Cooper Free

"REPUBLIC" Northern! oundry, Basic an "PIONEER" (Southern) Foundry and Basi



ALSO TRUSCON FOUNDRY FLAS

Designed for Rolling SPECIAL STEEL



The new Birdsboro Metal roll is designed specially for rolling special steels. If you are experiencing difficulty in rolling aircraft quality steel, alloy steel bars, corrosive steels or non-ferrous metals, try Birdsboro Metal rolls and get higher tonnages, less reduction per dressing, added toughness and roll strength. Call Birdsboro today!



BIRDSBORO STEEL FOUNDRY & MACHINE CO . BIRDSBORO, PA.

ROLLS



THERE'S many a mechanism today doing a better job—longer—because of specialized engineering principles applied to the springs. Automatic mechanical action calls for springs with the PEP to produce continued repetitive action, and the POWER to perform the desired function. Only sound engineering can provide both for individual performance requirements.

We have seen this in mechanical developments of the past. The unparalleled demands of this war have demonstrated it to a remarkable degree. Improvements and new devices to come will benefit from just such knowledge.

Make sure you get the best mechanical action by using Barnes-made springs with Engineered Pep and Power.



WALLACE BARNES COMPANY DIVISION OF ASSOCIATED SPRING CORPORATION

TEST BY

In this Midvale forging — as in all our steel-making — nothing is left to assumption. An "O.K." comes only after the piece passes utterly INSPECTION for freedom from segregation and injurious defect. Midvale's attention to detail, to perfection of workmanship at every Midvale job - is the yardstick by which it is done.

THE MIDVALE COMPANY • NICETOWN • PHILADELPHIA

OFFICES: NEW YORK . CHICAGO . PITTSBURGH WASHINGTON . CLEVELAND . SAN FRANCISCO



Custom Steel Makers to Industry

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Inghouse Speed Reducers

ECISION MANUFACTURING METHODS AND FACILITIES AT WESTINGHOUSE RESULT IN THESE LONG-TERM ADVANTAGES:

- · Quiet Operation and Long Life ... by the use of Single Helical Gears, cut by the Hobbing Process for maximum accuracy.
- · Maximum Load-Carrying Capacity and higher resistance to wear and shock by Westinghouse exclusive BPT heat-treatment of Gearing and Shafts.
- · High Operating Efficiency and low power losses in starting assured by precision machine work and use of antifriction type bearings.
- · Reliable "On-the-Job" Performance through station-to-station inspection of parts during manufacture; running test of each assembled unit before shipment.

For drives that require speed reduction—and four out of five drives do need speed reduction-it pays to install Westinghouse Speed Reducers. They bring advantages that add up to lowest installed and operating costs.

A complete series of standard Horizontal Parallel Shaft Type Speed Reducers (as illustrated) are available for ratings from approximately 10 to 1000 horsepower, Gearmotors from 1 to 75 horsepower.

Consult Westinghouse on new drives, or modernization of old ones. Complete engineering service, and servicing facilities through nationwide offices, warehouses and repair shops are available for your use. For details call your Westinghouse Office, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

There is a Westinghouse speed-reduction unit for most applications.

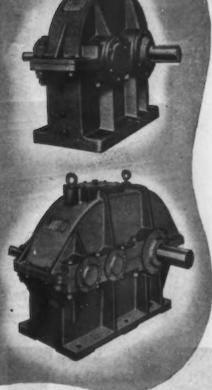
TYPE SH SINGLE-REDUCTION UNIT

Twelve unit sizes with thirteen standard ratios ... rated for continuous duty ... permit 100% starting and momentary over-

TYPE DH DOUBLE-REDUCTION UNIT

Twelve unit sizes with fifteen standard ratios . . . rated for continuous duty . . . permit 100% starting and occasional overloss

Westinghouse is also prepared to build units of special design to meet your unusual requirements, such as limited space or other special operating cos ditions.





tinghouse Speed Reducers



NEATLY ROUNDED FLANGES Just another simple job on

Did you ever have a problem in metal forming? Did you ever wonder how to make some unusual shape - and do it at the least possible cost? Many Steelweld customers have been confronted with such situations. Very often they have discovered the solution to be in their Steelweld press right in their own shop.

A stoker manufacturer had a problem on how to flange the edges of stoker panels. They had to be round and neat on three sides. He found the answer in his Steelweld. Now he flanges the edges of three panels per ram stroke quickly and accurately.

The varied work and the simplicity with which it can be done, makes a Steelweld press an unusually versatile tool that is appreciated more and more as its possibilities are discovered with actual experience. Write for booklet below and get the details.

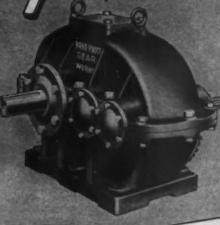


THE CLEVELAND CRANE & ENGINEERING CO. 1115 EAST 283 RD ST. WICKLIFFE. OHIO.

TEELWELD PRESSE

Brad foote Gears





Helical Gear Vertical 2:1 to 80:1

Spur

2:1 to 40:1

Herringbone Gear 2:1 to 295:1

Worm Gear 35/8:1 to 60:1 Speed Reducers 2:1 to 30,000:1

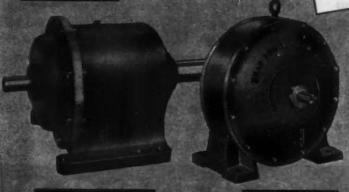
Brad Foote Speed Reducers made in all practical ratios employing every tooth form including bevels and spiral bevels have an exceedingly long record for continuous economical performance. All horse powers are available in this group of Brad Foote products—and all gears, shafts and parts are up to Brad Foote precision standards.



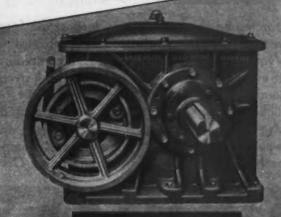
Planetary 4:1 to 400:1

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Gyro 16:1 to 30,000:1.

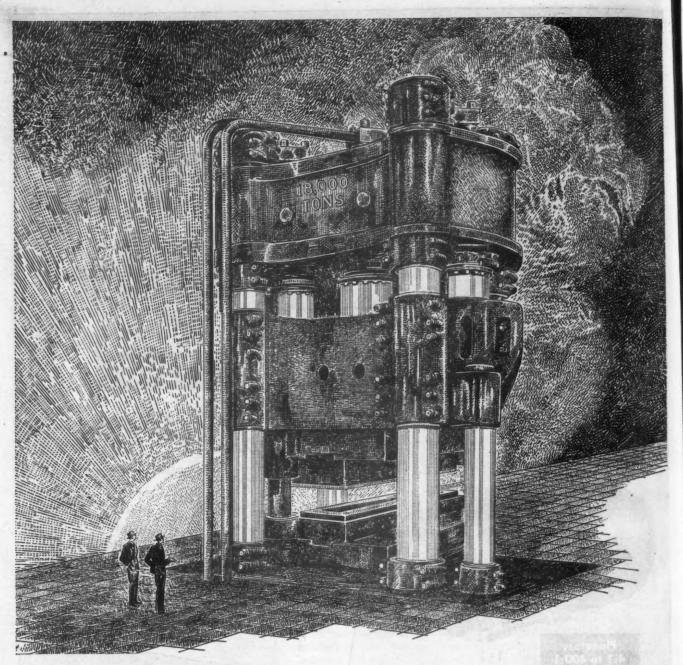


Oil Well Unit Little Giant

BRAD FOOTE GEAR WORKS

1309 SOUTH CICERO AVENUE DEPARTMENT N CICERO 50, ILLINOIS

THE IRON AGE, October 4, 1945-49



Looming on the horizon—the largest die forging press in the world, now in process of installation at Wyman-Gordon. When this press is completed at the end of this year, magnesium and high strength aluminum alloy forgings larger than any yet made will be available. This press will be operated by Wyman-Gordon Products Corporation, a wholly owned subsidiary of Wyman-Gordon Company for the account of Reconstruction Finance Corpo-

ration which owns the press, and will be available to aircraft manufacturers in particular and to industry generally for experimentation in and for the development and production of light metal forgings. This means to our aircraft industry reduced weight which, in turn, means increased payload and greater performance for American planes... And for industry in general—complete range of magnesium and aluminum forgings.

WYMAN - GORDON PRODUCTS CORPORATION

WORCESTER, MASSACHUSETTS, U. S. A.

N-A-X

HIGH-TENSILE STEEL

0

DESIGNER'S CHOICE...

V REDUCE MASS AND WEIGHT VINCREASE STRENGTH AND DURABILITY

By taking advantage of the high interent properties of N-A-X HIGH-TENSILE steel—great strength and toughness, exceptional formability, outstanding resistance to impact and fatigue, with good weldability and resistance to corrosion—manufacturers can have their choice of two fundamental improvements in product design:

1 Where reduction of weight means efficiency, lighter sections of N-A-X HIGH-

TENSILE steel can be used without sacrifice of strength. Its high properties take the place of mass.

2 Where increased strength and life characteristics are desirable, the use of N-A-X HIGH-TENSILE steel in the same sections will provide a stronger, tougher, longer-lasting product.

Certainly these demonstrable advantages are worthy of your consideration in the conquest of postwar markets.

GREAT STEEL FROM GREAT LAKES

GREAT LAKES STEEL

Corporation

N-A-X ALLOY DIVISION . DETROIT 18, MICHIGAN UNIT OF NATIONAL STEEL CORPORATION

THE IRON AGE. October 4, 1945-51



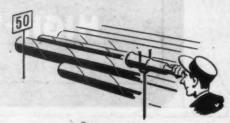
SPECIFY THE STEEL PIPE THAT GIVES YOU THESE 5 IMPORTANT ADVANTAGES

Here are five of the many reasons why ARMCO Spiral Welded Pipe cuts piping costs in all kinds of industrial plants

6"036"

1. WIDE SIZE RANGE

ARMCO Pipe is made in diameters from 6 to 36 inches, with wall thicknesses ranging from \(^{1}4\) to \(^{1}2\)-inch. This enables designers to choose the size best suited to each job.



2. LENGTHS UP TO 50 FEET

You can obtain ARMCO Spiral Welded Pipe in any length up to 50 feet. Long or short lengths of this light-weight pipe may be hung or supported easily and economically.



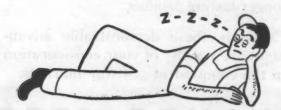
3. STANDARD OR SPECIAL FITTINGS

Our fitting shop is well equipped to fabricate unusual fittings as well as the standard types. By combining these with straight runs, unnecessary joints can often be eliminated.



4. QUICK, EASY INSTALLATION

With Armco's special method of pre-fabricating pipe, even the most complicated assemblies fit like a tailor-made suit. This means lower handling and installation costs.



5. LITTLE OR NO MAINTENANCE

ARMCO's custom-built piping saves time and trouble later. Longer lengths, fewer joints and welded fittings mean less chance for leaks. There are no threads to invite corrosion.

WRITE FOR THIS BOOK

We'll be glad to help with your next piping job. Write for the helpful bulletin—"6" to 36" Pipe for Industrial Uses." Armco Drainage & Metal Products, Inc., Welded Pipe Sales Div., 721 Curtis St., Middletown, Ohio.



ARMCO Spiral Welded Pipe

HOODOO SHASKERS! America's newest and widest line of V-Belts—Allis-Chalmers' Texrope — solves problems that have hoodooed drives in











Texrope V-belts are available nation-wide through Allis-Chalmers Dealers and Sales Offices

IT PAYS TO MAKE

ALLIS-CHALMERS

YOUR V-BELT DRIVE HEADQUARTERS

Texrope Super-7 V-Belts result from the cooperative research of two great companies — Allis-Chalmers and B. F. Goodrich — and are sold exclusively by A-C.

BULLETIN!

SPEED RECONVERSION WITH HELP OF NEW FREE A-C KIT!

Guide to "How to Take Reconversion Inventory" of Drives, Motors, Pumps

Help in the big job of reconverting for peacetime production is now offered to plants everywhere by Allis-Chalmers Mfg. Co., its district offices and distributors. To all who request it, we're sending the new "Reconversion Inventory Kit", planned to speed the task of determining the condition of your existing equipment — V-belt drives, motors, and centrifugal pumps — which will be used in reconverted production.

SUGGESTS PROCEDURE, STATES STANDARDS

Used by foremen, maintenance men, and engineers, the Kit is a real time-saver...leads efficiently to probable trouble spots, helps clear them up. Gives bearing tolerances, resistance formulae, etc., in compact, easily-used form. Check List appraisal charts help determine present and future condition of units inventoried.

HOW TO GET YOUR KIT

For your free Reconversion Inventory Kit, call your nearest Allis-Chalmers distributor or district office, or write Dept. 18, ALLIS-CHALMERS MFG. Co., Milwaukee 1, Wis.

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Please send Kit free of	Reconversion Inventory charge to:
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NOW AIR-HARDENABLE STEELS CAN BE SPOT WELDED . . . NO BRITTLENESS



Use this NEW TEMPERING

ATTACHMENT* with your

G-E Synchronous Electronic Control

The Hedstrom-Union Company, Fitchburg, Mass., makes use of this tempering control when welding X-4130 steel collars and shafts of helicopter-rotor blades.

IF medium-carbon steel, low-alloy steel, or highalloy steel is resistance-welded in the normal manner, the chilling effects of the water-cooled electrodes will cause the weld nugget to be brittle and generally unsatisfactory.

This new attachment enables spot welds to be tempered, increasing toughness and ductility, without removing the work from the welding machine.

Just 4 Steps

- 1. Make the weld in the normal manner.
- 2. Chill to several hundred degrees (cool time on pulsation welding).
- 3. Pass welding current of a definite value for a definite time to raise the temperature to tempering level. (This attachment provides the necessary additional adjustment of welding current-time and magnitude—for tempering.)
- 4. Allow the weld to cool in the normal manner.

And 4 Advantages

- 1. Extends the use of your present welding equipment by enabling you to weld air-hardenable steels and temper the welds in the welding machine.
- 2. Enables you to make ductile welds in presentday, air-hardenable steels, thereby reducing rejects due to brittleness.
- 3. Can be used in conjunction with the main welding control to obtain preheat or postheat.
- 4. Easy to install, as few leads to the main control

More Information Available

Write today for our new bulletin, No. GEA-4201. General Electric Company, Schenectady 5, N. Y.

*For use only with G-E pulsation-type, synchronous controls which include heat control by the phase-shift method.

Buy all the BONDS you can—and keep all you buy



RESISTANCE-WELDING CONTROL

NEW CENTERLESS THREAD GRINDING

Reduces Costs Up to 80%

The new method of centerless thread grinding reduces production costs of threaded parts an unusually large amount. This is due to the great productiveness of the Centerless Thread Grinder developed by LANDIS TOOL engineers.

Increases of 500% or more in output per worker help cut costs. An automatic loader steps up output still more. Other factors that help reduce costs as much as 80% are: change from 100% inspection to spot inspection; almost no rejects; short setup time; fast wheel recrushing with built-in crusher. Multiple point grinding with the Centerless Thread Grinder produces strong threads of accurate form. Working from solid hardened stock eliminates final hear treatment and gives a bright, smooth finish of exceptional accuracy.

The new LANDIS TOOL Centerless Thread Grinder can produce a wide variety of thru-feed threaded parts in addition to socket set screws. Our engineering department is available for consultation on your threading problems.

ADVANTAGES

Continuous thru-feed
Fewer rejects
Less inspection
Less downtime
Bright finish
Smooth surface
No heat treating
distortion
Automatic loader

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Precision Tool

Socket head screws centerless ground from solid hardened stock. Sizes from $\frac{1}{8}x \frac{1}{4}$ 11 pitch to No. $4^{2}x \frac{3}{8}$ 40 pitch.

LANDIS TOOL CO., WAYNESBORO, PA.



The E-P Man? Send him in

he is here to tell us more about **Industrial Logistics**

* Industrial LOGISTICS

The science of assembling and handling materials to insure maximum economies at every stage of (a) Procurement, (b) Production and (c) Distribution, using Elwell-Parker Electric Trucks, Tractors and Cranes; **Employing the correct containers** (Boxes, Barrels, Bags or Bales) in Master Unit Loads, on Pallets or Skids; To insure Greater Speed—Faster Production - Greater Turnover - Increased Safety—New Profits.

Mr. President and General Manager:—tell the receptionist to "send him right in" when the Elwell-Parker Materials-Handling Consultant calls. Industrial Logistics is an executive concern-a new, challenging way to think about the handling of all of your plant loads.

Bring your Director of Purchases, your Production Manager and your Sales Manager into the meeting-because Industrial Logistics ties

in with Procurement and Distribution, as well as Manufacturing.

Then give the E-P Man the job that years of successful experience best qualify him to do: searching out new ways to "transport your bigger loads faster-more safely-for less-in Master Unit Loads at every stage on Pallets or Skids."

He will start with raw materials from your Suppliers' plantsfollow through every step of your manufacturing and warehousing—finish with deliveries to customers and customers' customers.

Total savings probably will amaze you-will expand your market. Savings that are going to waste now-putting the brakes on progress-benefitting no one.

The Elwell-Parker Electric Company, 4225 St. Clair Avenue, Cleveland 14, Ohio.



DIAL THE MATERIALS-HANDLING CONSULTANT TODAY!

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Electric Co.

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Prointo ties ing. ence your oads

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ket.

nue,

"mirror finish" taps

greater wear resistance finer part finish less friction

This Sossner developed finish is now included on ALL of our taps . . . after scores of unsolicited letters to us gave ample proof of its

Steel Stamps of Stamps of

161 GRAND STREET, NEW YORK 13 or 27 BROADWAY, LYNBROOK, N. Y.



ROLLING TECHNIQUE...

DLOOMING MILL ROLLS



INGOT

of the two-high reversing type.
The rolls may be as large as 54" but average about 40". PITTSBURGH ROLLS for the blooming mill, whether of plain carbon steel for extreme strength, or of Phoenix "A" Alloy Steel where unusual wearing qualities are desired, will produce blooms, billets, and slabs at LESS COST PER TON OF STEEL ROLLED.

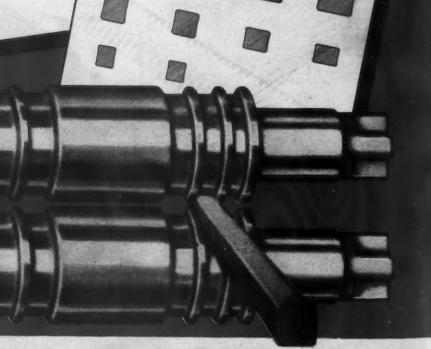
PITTSBURGH ROLLS

Division of Blaw-Knox Company

PITTSBURGH, PA.



The illustrations show how the cross section of the piece changes as it passes from ingot to billet.



PITTSBURGH R@LLS

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B. H. HAYES

O. L. JOHNSON, Manage der Service and Market Resi

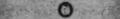
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This Week in The

Vol. 156, No. 14

October 4, 1945

Editorial

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10-THE IRON AST DUSTIN ASTRE



Careful handling and storing insures perfect condition of Allegheny Stainless from Ryerson stocks.

Ryerson stainless service includes Allegheny Stainless tubing and pipe ready for prompt shipment.



Ductility determinations of stainless sheets are made on the Erichsen machine in a Ryerson laboratory.

Which Allegheny Stainless Will Serve You Best?

Ryerson Offers Diversified Stocks, Technical Assistance, Prompt Shipment

25 types of Allegheny Stainless...a wide range of sizes in sheets, plates, bars, tubing, pipe, etc...are ready at Ryerson for your present production and postwar planning.

To help determine the best types for your use and how best to fabricate or apply them, technical help is available on small orders as well as large. Ryerson has stocked Allegheny Stainless exclusively since 1925 as the finest of stainless steels. The rich experience gained since that time is at your disposal.

11 conveniently-located Ryerson plants bring this complete service on Allegheny Stainless as close as your telephone. Contact the plant nearest you.

Joseph T. Ryerson & Son, Inc., Steel-Service Plants: Chicago, Milwaukee, Detroit, St. Louis, Cincinnati, Cleveland, Pittsburgh, Philadelphia, Buffalo, New York, Boston.



Write for the Ryerson Stock List describing 25 types of Allegheny Stainless and other steels in stock.



RYERSON STEEL

ESTABLISHED 1855

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October 4, 1945

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More or Less About More for Less

THIS epidemic of wildcat strikes and the threat of more serious large scale labor disturbances in the offing are due to a number of causes. One of them is the natural reluctance of war workers to take home less pay than they have been accustomed to receiving under the forced draft of war production. Another is the belief on the part of labor leaders and some economists that since wages constitute over 85 pct of our total purchasing power, it is important to maintain high level wage earnings if we expect to support high level employment.

Most thinking employers, and it is surprising, perhaps, how many of them think quite objectively about these matters, will recognize the first cause and agree with the second. Their problem simply resolves itself into the question "What will we use for money?"

Assuming for the moment that it was both desirable and necessary to increase postwar wage purchasing power some 30 pct, as demanded by union leaders, we face the problem of finding the money with which to do it. There are but three sources. One is from current profits. Another is from public subsidy through inflation. The third is from efficiency gains resulting in more purchasing power per dollar.

Labor leaders say we can get it from profits. Simple arithmetic will prove to them that this is not true. If all existing corporation profits, all dividends to investors and all incomes of \$25,000 or over were turned into the wage account the total would hardly be enough to result in a 5 pct wage rise across the boards.

Now for the second alternative, namely, public subsidy. That is the way we have been paying our war wages during the past several years. In effect it is robbing Peter to pay Paul because the burden falls back on the taxpayer in the form of present assessments on earnings and future obligations of increased national debt. This road leads straight to inflation because price rises are inevitable. By this method you can make take-home pay any amount you please provided you are willing to have take-home buying power reduced in like or greater proportion. But in the long run, nobody gains and everybody loses.

The third way of raising wages, the "real wage" way, is through efficiency gains and cost reductions that are passed along to the public in the form of more buying power per dollar. That is the traditional American way that has put this country in the most enviable position among nations.

Labor leaders also tell us that we have learned so much about improved production during the war that the resulting economies will finance higher wages. That remains to be seen. Why not then go to work and find out? If it is true it cannot be hidden, but it cannot be revealed in strike-closed plants.

Atthous wents



Forming pockets in Inland sheets is the first operation in making heads for 5-gal. containers

The Punch Press Proves It!

Form 1400 Pieces Per Hour-Breakage Negligible

There is one way to prove the true worth of a steel-watch its workability and economy as it goes through your manufacturing operations.

Steel produced by Inland has a remarkable record of performance. You can always count on its being true to specifications and of uniform quality, which assures an even flow of production at the planned rate.

In the photograph above, the operator is performing the first operation in making heads for 5-gal. containers. Pockets are being formed at the rate of 1400 per hour in 24 gauge Inland cold rolled sheets. Each pocket, formed by one press stroke, is 31/4 in. in diameter, 9 in. deep, with a pierced 1/2 in. hole. These 26-in. by 26-in. sheets are coated by lithography before forming. Wax applied to the coated side, which is placed on the lower die, serves as a lubricant as well as to protect the coating. Breakage of these Inland sheets is negligible.

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Inland engineers are ready to study your products and manufacturing methods, and recommend steels that will prove their true worth in your shop.

Inland Steel Company, 38 S. Dearborn St., Chicago 3, Ill. Sales Offices: Cincinnati, Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis, St. Paul.

Principal Products: Bars, Floor Plate, Piling, Plates, Rails, Reinforcing Bars, Sheets, Strip, Structurals, Tin Plate, Track Accessories.

INLAND SHEETS

NEWS FRONT

British shippards have over five year's work in sight. Some 288 new commercial vessels are under construction or on order, and many new orders are in prospect. Because of concentration during the war on combat vessels the British are seriously short of their necessary commercial ships, and the present building program is the initial step to correct the deficiency.

The British claim that construction there is only one-third of the cost of

construction in the U.S.

British stocks of mustard-gas shells are being loaded on old ships, towed some two hundred miles northwest of Ireland, far from fishing grounds, and sunk in 2000 ft. of water. The crews wear gas masks during the last voyage. Some 20,000 tons of shells are currently being disposed of in this manner.

► So far Britain has paid blitz war damage claims to the total of \$1,085,000,000

➤ Application of induction heating to over 200 different processed or semiprocessed materials at the experimental laboratories of the Commonwealth Edison Co. has been so successful that company engineers believe that there are few, if any, manufacturing operations involving the use of heat to which high-frequency current cannot be applied.

Offering an interesting new field is the application of high-frequency heating for preheating before impregnating. In every case, heating before impregnating wil increase depth of penetration and heating after impregnating will prevent case

hardening brought about by premature surface hardening.

Sodium acid sulfate has been found to give satisfactory results in neutralization of heat-treating baths for aluminum alloys. In addition to conserving critical materials like chromium compounds, its use saves approximately 75 pct in cost of materials.

Shift of economic stabilization responsibility from the departed William H. Davis to John W. Snyder is reported to carry with it a change in emphasis in wage-price

"hold-the-line" philosophy.

Davis' remarks that the administration viewed favorably an eventual 50 pct wage increase may have represented an indiscreet revelation rather than his own views, for his administrative policy favored wage increases only if no price adjustments were involved.

Snyder reacts favorably to wage increases if justified on merit whether or not price adjustment is necessary. Chester Bowles, adamant hold-the-line advocate,

faces over-ruling and may depart.

Chrysler and General Motors are anxious to clean the wage slate and get into production. Impartial observers of preliminary negotiations sense that a 15 pct increase may be secured without a fight but that slightly over 20 pct may be gained if a comparable previous settlement is made in the petroleum refinery strike, now carrying the ball in the various industrial wage level disputes.

It is generally agreed that the bag is ready to burst somewhere, and whichever major industry settles first will likely set the pace for the electrical workers, the farm equipment workers - and possibly steel - now holding the strike threat.

Long range economists see, after the present settlement, a series of creeping inflationary advances, then a fast crawl followed by another major "hold-the-line"

attempt - then a repeat of the whole process.

Slated to enter the packaged housing business is Borg-Warner Corp. Henry Kaiser has encountered obstacles in his prefabricated housing development, causing unexpected delay. Borg-Warner will probably beat Kaiser to the merchandising stage with well integrated units now almost ready to go.

► Breaking up of large cities into towns of approximately 40,000 population is the only safe way to avoid obliteration by atomic bombs Professor W. F. Ogburn, University of Chicago specialist on the effect of new inventions on social

institutions, declared.

He predicts another war with use of rocket propelled atomic bombs over the Atlantic or Arctic wastes. Cost of the relocation scheme would be about \$250 bill:

Metallography

Of Alcoa

75S Alloy

By F. KELLER

Chief, Metallography Division, Aluminum Research Laboratories, New Kensington, Pa.

... Use of zinc, magnesium and copper as major alloying elements in this highstrength aluminum constructional alloy produces somewhat different microstructural characteristics than in other aluminum alloys. Herein are given etches and procedures for studying the microstructure of 75S, as well as a discussion of the more important microstructural features.

NE of the important developments in the high-strength aluminum alloy field is represented by Alcoa 75S alloy. This superstrength material permits aircraft designers to employ considerably higher design values for the development of airplanes with increasingly better performance characteristics.

¹ The Iron Age, issue of April 6, 1944; and Metals and Alloys, October, 1944.

The new alloy contains zinc, magnesium and copper as the major alloying components together with small percentages of manganese. chromium, titanium and iron. Use of these elements as the major alloying constituents produces somewhat different microstructural characteristics in 75S alloy from those of 17S, 24S and 61S-type alloys because the principal hardening constituent is a Zn-Mg phase instead of CuAl, Al-Cu-Mg or Mg2Si. This article shows in a general way the more important microstructural features of this recently developed high-strength aluminum

The procedures employed for the preparation of specimens of Alcoa 75S alloy for microscopic examination are essentially the same as those used for various other aluminum alloys. These procedures are described fully in Aluminum Research Laboratories Technical Paper No. 7.2 In brief, the steps required are as follows:

- (1) Obtain plane surface by rubbing specimen on a medium mill file.
- (2) Remove marks left by file

by rubbing specimen by hand on Nos. 0, 00 and 000 metallographic emery papers in the order named. These papers should be lubricated with kerosene or a mixture of kerosene and paraffin to prevent smudging.

- (3) Polish on a rotating disk covered with a Kitten's Ear broadcloth, Natural Cashmere cloth or a Gamal cloth pad. The disk should be operated at about 300 r.p.m. and No. 600 Alundum flour should be used for the abrasive.
- (4) Polish finally on a rotating disk covered with a Kitten's Ear broadcloth, Natural Cashmere cloth or a Gamal cloth pad. The disk should be operated at about 150 to 200 rpm with heavy magnesium oxide as the polishing medium. For moistening the pad, distilled water, not tap water, should be used.
- (5) After these polishing operations are completed, the specimen should be washed in a stream of warm tap water and dried by blowing the excess of water from the surface. The polished surface should not be touched or rubbed against anything; otherwise, the finish may be ruined.

The etching procedures used for revealing the microstructural characteristics of Alcoa 75S alloy are practically the same as those employed for the other heat treatable aluminum

alloys and are as follows:

Etching Solutions for 75S Alloy

centration	Specific Use	Remarks
cone) 1.0 ml (cone) 1.5 ml 02 (cone) 2.5 ml	General microscopic	Immerse specimens
er 95.0 ml	des sey, design of	
conc) 1.0 mi (conc) 1.5 mi	For distinguishing heat-treated from heat-treated and aged	Immerse specimens for 15 to 30 sec
0 ₂ (conc) 10.0 ml er 87.5 ml	temper	way one with
H 10 a	For revealing grain structure	Immerse 10 to 20 sec at 160° F. Dip in
	cone) 1.0 ml (cone) 1.5 ml 03 (cone) 2.5 ml er 95.0 ml cone) 1.0 ml (cone) 1.5 ml 02 (cone) 10.0 ml er 87.5 ml	cone) 1.0 ml General microscopic 1.5 ml 0.2 (cone) 2.5 ml er 85.0 ml cone) 1.0 ml For distinguishing heat-treated from heat-treated and aged temper er 87.5 ml

² Technical Paper No. 7, "Identification of Constituents of Aluminum Alloys," Aluminum Co. of America, Pittsburgh.

In general, very satisfactory results can be obtained by etching the specimens with Keller's etch for about 10 to 20 sec. The time required for obtaining the best results with etching will vary with the temper of the material and the character of the polish that is obtained. Etching should be continued until the desired results are obtained but should not be carried to the point where etching pits become prominent or the constituents and grain boundaries are attacked appreciably.

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For developing the grain structure of 75S alloy in the annealed condition (75S-O), it will be found preferable to use the sodium hydroxide solution. Etching is accomplished by immersing the specimen in the sodium hydroxide solution which is used at a temperature of 70°C (160°F). The time required for etching will vary from 10 to 20 sec. depending on the condition of the specimen and the character of the polish. After a specimen is etched as described, it will bear a stain which can be removed by a dip in concentrated nitric acid.

It is often necessary to determine whether 75S alloy products are in the heat-treated or the heat-treated and aged temper. The use of Keller's etch will not ordinarily reveal enough difference in microstructure to distinguish these two tempers with any degree of certainty. The modified Keller's etch, however, will produce differences in microstructure which will aid in distinguishing 75S-W from 75S-T. The etching procedure is the same as with normal Keller's etch. It consists in immersing the polished specimen in the etching solution for about 25 sec, rinsing in warm water and drying. With this etching treatment, the grain structure of the alloy will be revealed with different degrees of contrast between the variously orientated grains. Specimens having a relatively high degree of contrast between the variously orientated grains are representative of the heat-treated temper, whereas, those with low contrast are in the artificially-aged temper.

Microstructural Characteristics

In cast form as, for example, ingots for rolling or extrusion, 75S alloy exhibits a dendritic structure with zones of solid solution coring and a discontinuous constituent network at the interstices of the dendrites and along grain boundaries. An example of the structure of 75S-type alloy in the ascast condition is illustrated by fig. 1. This specimen was from an ingot which had been slowly cooled to obtain a very coarse network structure. This network structure is made up of

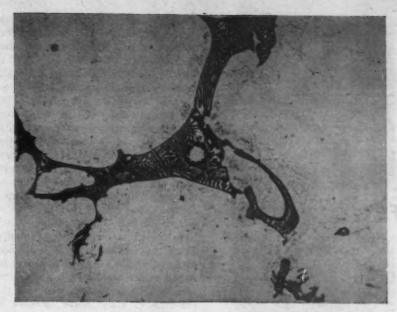


FIG. 1—Eutectic network in slowly-cooled ingot of Alcoa 75S alloy. Keller's etch, 10 sec; at 500X.

particles of several intermetallic compounds formed by combinations of the alloying elements in this alloy. Some of these compounds are soluble, others have slight or practically no solubility.

The most important alloying constituent in 75S alloy is a Zn-Mg phase which has appreciable solubility and which imparts very high strength to the alloy when it is dissolved by suitable thermal treatments. The general appearance of the Zn-Mg constituent is illustrated by figs. 2 and 3. As is evident from fig. 2, this constituent is outlined but is uncolored when the specimen is etched for about 10 sec. in a 0.5 pct HF solution and it is blackened when etched for 15 sec in Keller's etch, as shown by fig. 3.

Working 75S alloy by rolling or by extrusion alters the cast structure of the ingot and tends to distribute the constituents more uniformly throughout the matrix. These constituents

tend to be aligned in the direction of working. The structure of wrought 75S alloy, therefore, is largely influenced by the type and amount of working as well as by the various thermal treatments that the material has received.

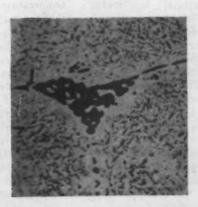
The microstructure of as-rolled 75S-type alloy sheet is shown by fig. 4. In this temper, the material is essentially unrecrystallized and most of the hardening constituents are out of solution and appear in the matrix as many small particles which are rather difficult to identify. As-rolled sheet, therefore, is representative of coldworked and unrecrystallized material which contains an appreciable amount of work hardening.

The annealing temperatures usually employed for 75S alloy will dissolve very little of the constituents present; therefore, the size and arrangement of the constituents will be somewhat similar to that obtained for

FIG. 2 — Soluble Zn-Mg phase as large particles and precipitate. This etch (.05 pct HF) outlines but does not color or attack this phase. At 500X.



FIG. 3—Same area as fig. 2 after using Keller's etch. 10 sec; the Zn-Mg constituent is blackened. At 500X.



THE IRON AGE, October 4, 1945-65

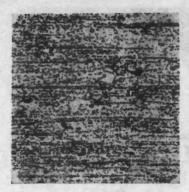


FIG. 4—Hard-rolled 75S alloy sheet, using Keller's etch, 10 sec. At 500X.

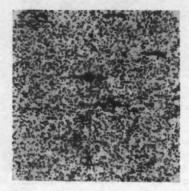


FIG. 5—Annealed 75S alloy sheet (75S-O), using Keller's etch, 10 sec. At 500X.

the as-rolled temper. A typical example of the constituent size and arrangement in 75S-O-type sheet is shown by fig. 5. When as-rolled material of this type is subjected to an annealing treatment, recrystallization will occur if the material has been cold worked sufficiently. The recrystallized structure of annealed material of this alloy is illustrated by fig. 9.

When annealed sheet with a structure of the type shown by fig. 5 is subjected to a solution heat treatment in the proper temperature range, the various constituents that are present will tend to dissolve in proportion to their solubilities and will be dispersed throughout the matrix in solid solution. Practically all of the Zn-Mg constituent in this alloy is soluble at the normal heat-treating temperature. Therefore, substantially all of the particles of this constituent will be dissolved by heat treatment; left will be the particles of Mg.Si and the constituents containing CR, Fe and Mn. The microstructure of 75S-W alloy representing the condition that obtains after a solution heat treatment is shown by fig. 7. The microstructure in this case is essentially that of a solid solution with a few particles of insoluble constituent appearing in the matrix.

In 75S-type alloy, the amount of

grain contrast developed between the grains of different orientation when Keller's etch is used is far less than that ordinarily obtained for 17S-T or 24S-T alloy. Grain contrast is actually from a surface film which is deposited on the sample during etching. The contrast and color of this surface film is dependent chiefly on the amount of copper in solid solution. This alloy, however, does not contain enough copper in solid solution after heat treatment to produce a surface film of etching products with nearly as much contrast and color as that obtained on alloys of 17S and 24S-type which have much high copper contents. Thus, grain contrast as it is usually obtained with Keller's etch cannot be employed for evaluating the effectiveness of the heat treatment of the 75S-type of alloy. Some increase in grain contrast can be obtained by prolonged etching. This, however, will tend to cause undue etching attack at the grain boundaries and on the con-



FIG. 6 — Heat-treated 75S alloy sheet (75S-W), using Keller's modified etch, 25 sec. At 500X.

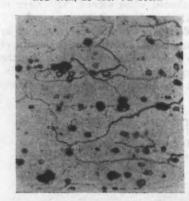


FIG. 7—Structure of heat-treated and aged 75S alloy sheet (75S-T), using Keller's modified etch, 25 sec. At 500X.

stituents that remain out of solution.

Where it is desired to attempt to evaluate solution heat treatment from the microstructure, the modified Keller's etch will give fairly good results. Sheet materials of 75S-type alloy will generally be fully recrystal-

lized after a solution heat treatment and will develop fairly well defined grain boundaries on etching; extrusions or other products produced by hot working will remain unrecrystallized and some difficulty may be experienced in revealing the grain structure satisfactorily.

The very high tensile and yield strengths of 75S-type alloys are obtained through the use of a precipitation heat treatment following a solution heat treatment. This precipitation heat treatment results in the formation of precipitate particles of a critical size and dispersion which strengthen and harden the matrix to a desired strength. The precipitate phase which forms in this alloy is largely submicroscopic in character. It cannot be revealed by the metallurgical microscope. Thus, the microstructure of heat-treated and aged 75S alloy (75S-T) will appear practically the same as that of material that has had only a solution heat treatment (75S-W) with the usual etching procedures. When modified Keller's etch is employed, there will be an appreciable difference in grain contrast between the heat-treated and the heattreated and artificially-aged. These differences in structure are illustrated by figs. 6 and 7.

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In interpreting the microstructure of 75S-type of alloy by differences in grain contrast, it should be kept in mind that variations in grain contrast will result from slight differences in the character of the metallographic polish and in the etching procedure. In order to minimize these differences, it is generally good practice to include samples of definitely known tempers with the samples of the unknown tempers in the same metallographic specimens. Under these circumstances, all of the specimens will receive the same metallographic polish and etch and any possible variations in structure will not be the result of differences in preparation. Furthermore,

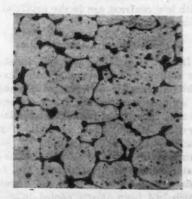


FIG. 8—Grain boundary melting in overheated 75S-T alloy sheet, using Keller's etch, 10 sec. At 500X.

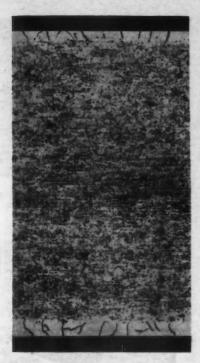


FIG. 9—Alclad 75S-O sheet. NaOH etch, at 100X.

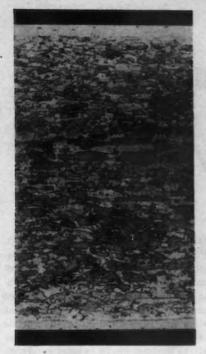


FIG. 10—Alclad 75S-W sheet. Modified Keller's etch, at 100X.

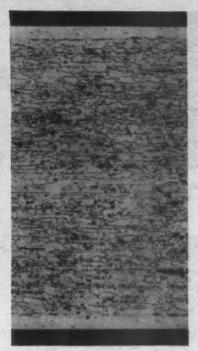


FIG. 11—Alclad 75S-T sheet. Modified Keller's etch, at 100X.

slight differences in structure are more readily recognized when the samples being compared can be viewed in the same microscopic field.

Since the principal hardening constituent Zn-Mg in this alloy is very soluble and thus dissolves rapidly upon heat treatment, there will be practically no areas of eutectic composition remaining to melt if the eutectic temperature of the alloy is exceeded. Thus, this alloy is not nearly as susceptible to overheating as the 24S-type of alloy. It is possible, however, to get incipient fusion in 75S alloy if the temperature employed for heat treatment exceeds the specified range. Under such circumstances, the alloy will tend to melt along the grain boundaries and a partial as-cast structure as illustrated in fig. 8 will develop.

In sheet form, Alcoa 75S type alloy is furnished as an alclad product. This product bears a thin coating of an aluminum alloy containing 1 pet zinc on both surfaces. The nominal thickness of the Alclad coating on this product is 4 pct of the total thickness of the composite sheet on each surface. A representative micrograph showing a full cross-section of 20 gage 0.032-in. Alclad 75S-O sheet is included as fig. 9. In this micrograph, the alloy coatings are readily distinguishable from the core material. Representative micrographs of a full cross-section of the same material after solution heat treatment (Alclad 75S-W) and a solution and precipitation heat treatment (Alclad 75S-T) are shown by figs. 10 and 11. The differences in microstructure between the core portions of Alclad 75S-O, Alclad 75S-W and Alclad 75S-T sheet makes it relatively easy to distinguish these tempers by metallographic examination.

When Alclad 75S alloy sheet is heat treated, some of the magnesium, zinc and copper will migrate into the aluminum-zinc alloy coating layer and form a diffusion zone. The diffusion of relatively large amounts of magnesium and zinc does not detract from the resistance to corrosion of this product. The diffusion of copper on the other hand will be relatively low since the 75S alloy core contains only a small amount of copper as compared with the core portion of Alclad 24S alloy. Thus, the amount of copper available for diffusion is less and even with rather prolonged heat treatment

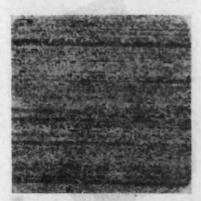


FIG. 12 — As - extruded 75S alloy. Keller's etch, 10 sec, at 100X.

or with repeated heat treatments, the amount of copper that will diffuse will not be excessive. Thus, from the standpoint of diffusion, Alclad 75S type of alloy can be heat treated for longer periods than Alclad 24S-T sheet without any adverse effects from diffusion. The diffusion of magnesium and zinc into the Alclad coating on Alclad 75S sheet, however, may produce structural changes which may be mistaken for the diffusion of copper. Thus, the fact that the surface of the sheet may have darkened during heat treatment does not necessarily mean that the amount of diffusion has been excessive and that the resistance to corrosion of the product has been altered.

Another form in which Alcoa 75S alloy is furnished is as extrusions. This type of product is made entirely by hot working and the microstructure of shapes will vary somewhat depending on the size and shape of extrusion, the conditions required for extrusion and the location in the extruded length. Thus, the microstructure of 75S alloy extrusions may appear very different from that of Alclad 75S alloy sheet.

In the as-extruded condition, shapes made from 75S alloy will remain largely unrecrystallized after heat treatment and the microstructure may vary appreciably from one cross-section to another depending on metal flow during extrusion. The microstructure of a 75S alloy shape in the as-extruded condition is shown at 100

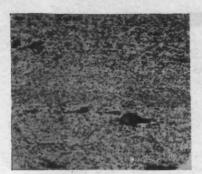


FIG. 13 — As - extruded 755 alloy. Keller's etch, 10 sec, at 500X.

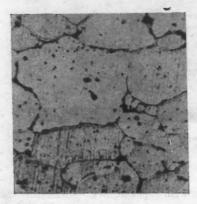


FIG. 16—Grain boundary melting in overheated 75S-W extrusion. Keller's etch, 10 sec, at 500X.

and 500 diam by figs. 12 and 13. In this condition, the constituents are largely out of solution and the structure appears to be composed of many layers of long, narrow grains. When an extrusion of this type is given solution and precipitation heat treatments to produce the 75S-T temper, the structure appears as shown by figs. 14 and 15.

In the extruded form, 75S alloy may remain partially or totally unrecrys-

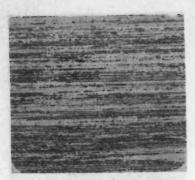


FIG. 14 — Heat-treated and aged 75S-T extrusion. Keller's etch, 10 sec, at 100X.

tallized even after heat treatment. For this reason, it is not always possible to develop the clear-cut boundaries and grain contrast that are obtained for recrystallized 75S-T sheet product. Extrusions of 75S type of alloy are somewhat more susceptible to overheating than sheet of these alloys because there is more tendency for segregations of eutectic composition especially in the heavier extruded sections. Thus, a lower temperature range is specified for the heat treatment of 75S alloy extrusions. Overheating in a 75S alloy extrusion is shown by fig. 16.

As mentioned previously, the microstructure of the heat-treated and heat-treated and aged tempers of 75S alloy represent essentially a solid solution. Some particles will be observed of the less soluble constituents of this alloy in the solid solution matrix. These particles will consist of Mg₂Si, Al-Cr-Fe and Al-Cr-Fe-Mn-Ti constituents.

Under some conditions of manufacture and in some types of product, the chromium-bearing constituents may tend to segregate or to be somewhat

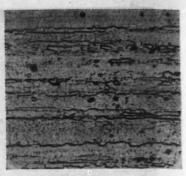


FIG. 15 — Heat-treated and aged 75S-T extrusion. Keller's etch, 10 sec, at 500X.

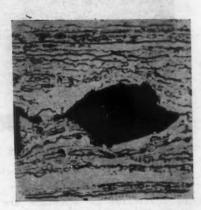


FIG. 17—Oversize particles of insoluble constituent in 75S-T alloy extrusion. Keller's etch, 10 sec, at 500X.

larger than the constituent particles in other aluminum alloys. In wrought materials, these oversize particles are usually aligned in the direction of working. The appearance of one of these oversize particles of constituent in a 75S alloy extruded section is illustrated by fig. 17. Particles of this constituent are usually of a duplex nature since there is an outer zone which tends to etch darker than the central portion.

New Method of Producing Embossing Dies

BY combining metal spraying and pantographic engraving processes, New Method Steel Stamps, Inc., 147 Jos. Campau, Detroit 7, has evolved a method for rapidly producing male and female embossing and debossing dies of a consistently high degree of mating accuracy.

In this particular diemaking process, a brass pattern is first prepared for the male embossing or debossing die. After this pattern has been used as a template in the pantographic milling of the male die, white metal is sprayed onto the pattern to a depth of approximately 1/2 in., forming the



female die pattern. This operation gives an exact reproduction of the male die. The procedure can be so carefully controlled as to assure the proper clearance for any gage of sheet metal between the completed, mating dies. The extremely accurate mating of the male and female dies made in this manner further insures that there will be no shear in the sheet metal embossed with them.

Pantographic milling and metal spraying, used in conjunction in this manner, has been found to be applicable to the production of a wide range of embossing and debossing

Low-Temperature Behavior Of Ferritic Steels

O clarify some of the points of low-temperature behavior of commercial NE, SAE and similar steels relating to composition, heat treatment, grain size and hardenability, experimental work was carried out at the University of Kentucky under the auspices of the War Metallurgy Committee.

Those peculiar differences in lowtemperature behavior and treatments that are shown by notched-bar tests, but are not equally revealed by other mechanical tests, exist chiefly, indeed almost exclusively, in ferritic steels and are almost or entirely absent in austenitic steels, copper base, nickel base and most other industrial alloys.

Different ferritic steels and microstructures may show like foot-pound notched-bar values and tough fractures at room temperature or somewhat above, but as the testing temperature is progressively decreased, some steels and structures show rather abrupt declines in the temperature-foot-pound curves, and brittle instead of tough fractures appear. This drop usually occurs over a range of temperatures and the fractures within this range tend to be mixed, that is a brittle patch or patches appear along the tough, silky fracture. Plotting notched-bar data over a range of temperatures produces curves similar to the type shown in fig. 1.

The cross-hatched plot in fig. 1B is from Zener and Hollomon.* The transition region is not necessarily in so nearly a vertical position as is indicated in this chart. It may also be spread over a much wider area.

* C. Zener and J. H. Hollomon, "Plastic Flow and Rupture of Metals," Transactions, ASM, vol. 33, 1944, pp. 163 to 235.

There is no exact foot-pound level at which the fracture changes sharply

...Guns and armor sometimes have to operate at -50°F; aircraft may operate at temperature approaching -100°F, and in equipment for low-temperature processing of petroleum products and synthetic rubber, for example, temperatures of -300°F or below may be required. The engineering questions raised by the low-temperature behavior of steels gave rise to a research program under War Metallurgy Committee guidance. The results of this experimental work conducted at the University of Kentucky are herein summarized.

from tough to brittle. Therefore, no arbitrary foot-pound specification can be drawn to differentiate between the types of fracture. The transition temperature range in which the drop occurs cannot be exactly predicted from tests other than notched-bar tests, nor from the composition, heat treatment or microstructure of the steel. As a matter of fact, supposedly duplicate heats of steel with duplicate heat treatments and indistinguishable structures, may behave quite differently as to transition temperature ranges and to foot-pound energy absorbed at low temperatures.

This individuality of heats of steel and of their response to a given heat treatment is minimized when the steels are so "finished" in melting that a fine-grained, difficultly coarsenable steel results, and when the heats being compared have like hardenabilities.

Very considerable differences in notched-bar behavior are met in wrought steels when longitudinal and transverse specimens are compared, the latter results tending to be much lower than the former. These discrepancies are greatest in steels high in nonmetallic inclusions or with banded microstructures. Some variation, however, is likely to exist in even the cleanest steels of the most uniform structure, unless the steel has been cross-rolled or otherwise worked to minimize directional differences. Cast

steels, of course, do not show such directional properties.

It cannot be assumed from notchedbar data on longitudinal specimens that a given piece of steel will behave in the same fashion when the notch and the applied stress come in another direction.

Two types of conventional notchedbar specimens, each 10 mm x 10 mm (0.394 x 0.394 in.) cross-section, are ordinarily used in low-temperature

Except in the rare case where a cold room is available, the Izod impact test, in which the specimen is gripped at one end and struck on the other end above the notch, is not used for lowtemperature studies because of difficulty in quickly gripping the cooled specimen and in knowing just what the temperature of the breaking section is at the instant of fracture. Instead the Charpy specimen is used, since this is not gripped, but the cooled bar is merely laid on two supports, with the notch equidistant between them and struck on the face away from the notch. The cooled bar can be so rapidly manipulated that the temperature change is small and may be accurately adjusted so that the bar is at the desired temperature at the instant of fracture.

The standard Charpy bar for room temperature use has a round or keyhole notch, 2 mm diam, extending half

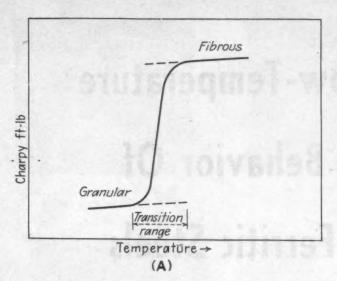


FIG. 1 — Charts A and B illustrate the effect of temperature on notchedbar data. The transition area in B is not always so nearly vertical since there is no definite energy level at which fractures change qualitatively from tough to brittle.

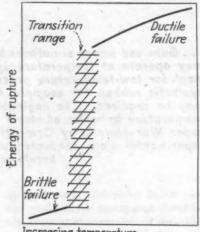
the depth of the bar. In making lowtemperature tests the round notch is most commonly used. However, the sharper V-notch of the Izod bar subjects the specimen to more severe stress concentration and is therefore preferred by some operators who employ the Charpy bar with the Izod notch. The Izod notch, however, is cut only to a depth of 2 mm leaving the breaking section 10 mm x 8 mm instead of 10 mm x 5 mm as with the regular Charpy notch.

The V-notch is cut with a milling cutter, the round notch is drilled, then opened to keyhole shape, usually by a saw cut. There are difficulties in drilling at the edge of the specimen so as to make the breaking section of a specimen with a Charpy notch the same as of one with the Izod notch, and conversely, there are difficulties in making the Izod notch deeper and still controlling the shape and finish at the base of the notch.

In German practice, the Charpy notch is moved closer to the edge, leaving a breaking section 10 mm x With these three different, widely used, notched-bar specimens, exact correlation of data becomes difficult for the two factors, intensity of notch and size of breaking section, confuse the situation.

Any of these bars has a relatively small breaking section and larger bars would often give more pertinent information, but for tough steels they are beyond the range of the usual impact testing equipment. Double width bars, 20 mm wide, giving a round notch breaking section of 20 x 5 mm or a V-notch section 20 x 8 mm or even triple width bars are sometimes used on steels of low and intermediate toughness.

Despite the German practice of reporting data in terms of energy absorbed per square centimeter of break-



Increasing temperature Decreasing rate of load application -Decreasing transverse stresses (B)

ing section, calculating results in such fashion does not correct the results to a comparable basis. Data from one notch and section are not convertible to any other notch or section.

Still more important, no laboratory bar gives data convertible into footpounds of energy absorbed by an actual part in actual service. For reliable information on actual parts, the part should be tested full size and with its own actual system of stress concentration. Hence, the choice of one bar over the other for research or test purposes does not seem a matter of great importance.

The V-notched bar is often credited with greater selectivity and with more readily showing the transition temperature through the appearance of high and low values on duplicate specimens tested at that temperature. However, in the experiments here reported the round notched bar gave many clear indications of a transition temperature range.

On the basis of comparative tests in which no superiority, for present

purposes, was exhibited by either bar. and because there are more published low-temperature, round notched-bar data available for comparison than with the V notch, the round notch was used in the present work.

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Only single width bars were tested in this investigation. Correlation of subsize, and of double and triple width specimens, with transition temperature ranges would have been interesting, but so great a multiplication of the already voluminous data was not feasible.

Service Conditions Not Represented

The notched-bar test is an artificial, or conventional, test which imposes restraint upon deformation during fracture, with the development of multiaxial stresses. The energy absorbed is governed by the degree of restraint and by the intensity of the multiaxial stresses. This restraint and these multiaxial stresses are not the same in specimens in different sizes or with different notches. Hence, no particular specimen can be chosen that will certainly represent the stress conditions of an actual part in service. Since parts in service are commonly much larger than the conventional notched-bar specimen, those parts if severely notched, may fracture in brittle fashion when made from steel with a given microstructure, even though the steel with that structure is evaluated as tough by the conventional test.

Conversely, a part in service that is not severely notched, or that is small in section and has less restraint upon deformation, may give a tough fracture when the conventional test shows a brittle fracture. The quantitative figures from a notched-bar test, therefore, do not give a sound basis for engineering design. Passing or failing to pass an arbitrary footpound specification by a particular lot of steel carries no certainty of survival or failure of an actual part made from that steel in actual service.

Single-blow notched-bar test results give no indication whatever of notch sensitivity or lack of notch sensitivity under repeated stress. This is illustrated in fig. 2. Hence, notched-bar test results form no basis for approval or condemnation of a steel or structure for service under conditions of notch fatigue.

The low-temperature notched-bar test, however, does reveal differences among steels and microstructures not revealed by other mechanical tests.

Conventional notched-bar specimens, tested at low temperatures, give a purely qualitative appraisal as far as engineering design is concerned, but one that may throw light on the metallurgical causes for the differences met, which in turn may lead to improved control of melt-finishing practice and to selection of heat treatment that will be useful from the engineering point of view in relation to low temperature service. Nevertheless, even the maximum of such improvements cannot be expected to produce material able to withstand the most severe conditions of multiaxial stress without fracture. Recognizing that the tests are of a conventional or artificial nature, the production of steels and structures that show tough low-temperature notchedbar behavior under the arbitrary test conditions is favored by various factors, notably by fine grain, by full martensitic quenching and tempering back (but neither to extreme softness nor extreme hardness) and by low carbon content.

Because the conventional specimens are small in section, not only is there the size effect to consider when discussing an actual part, but there is a further size effect in that the cooling rate at the center of a large piece, during normalizing or quenching, is very different from that of a small piece like the conventional notched-bar specimen, so very different metallurgical structures may appear and very different notched-bar behavior be found.

Notched-bar data from pieces heat treated in small sections are, therefore, not reliable for appraisal of the behavior or larger heat-treated specimens or parts. Practically no data are available on notched bars from the centers of large sections.

Slack Quenching Harmful

Considerable evidence has been accumulated in these experiments to show that slack quenching, producing a martensite-bainite mixture, is deleterious.

Slack quenching, such as occurs in the interior of a large section of a steel of low hardenability, gives bainite structures in the interior. On tempering, the interior may be little different in hardness from the fully quenched martensitic and then tempered exterior, and the microstructure may not be very clearly distinguishable, yet the low temperature behavior of the core may be much impaired.

The production of pure martensite throughout a quenched section is rare; the martensite will be accompanied by some bainite or by some retained austenite. The effect of retained austenite on notched-bar behavior may be different at room temperature (where it might act as a

toughening cushion) and at low temperature (where it may transform to untempered, brittle martensite). In this work no attempt was made to determine directly whether or not any austenite was retained. Indirect evidence of its presence was secured in certain of the austempering experiments but these have little direct bearing on ordinary heat treatment of the steels concerned. Indirect evidence of absence of, or lack of effect of, any retained austenite in oil-quenched and tempered SAE 2340 was obtained in a study of effect of time at -110°F on the notched-bar values at that temperature, and on the room temperature and -110°F values after 15 cycles of cooling to and holding at -110°F for 20 hr then warming and holding at room temperature 4 hr. No differences were observed. However, marked differences were found in austempered SAE 3312 as a result of cooling to -110°F.

Bainite structures obtained by aus-

tempering, that is constant temperature transformation, sometimes show good toughness, even at low temperatures, but the necessary adjustment of steel composition and the limited range of sizes in which austempering is effective for toughening make the production of bainite structures that will prove beneficial for low temperature behavior a tricky matter. In general the appearance of bainite structures during conventional heat treatment is accompanied by inferior low-temperature behavior.

Fine grain size ordinarily accompanies, but may not itself be the direct cause of, energy absorption at low temperatures. The lesser tendency to work hardening in the fine-grained steel may be as responsible for its behavior as the fine grain itself. However, the improvement is generally ascribed directly to fine grain or alternatively to an aluminum effect. This, of course, means actual fine

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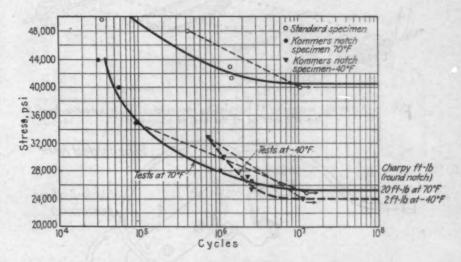
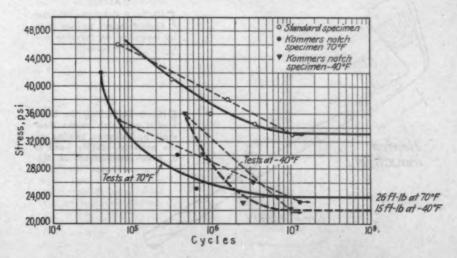


FIG. 2—The fatigue curves of two different steels, one an acid electric cast steel normalized from 1650° F and drawn at 750° F (top) and the other a converter cast steel normalized at 1650° F and drawn at 750° F show graphically that single blow notched-bar test results give no indication whatever of notch sensitivity or lack of notch sensitivity under repeated stress. The Kommers notched used here is a square, right-angled notch.



Uncommon Applications of High-

ALTHOUGH induction heating is well established in the metal working industry, its use has been confined chiefly to such operations as shrink fitting and heat treating of conventional parts. Believing, however, that there were many fields to which this method of heating could be applied, the Commonwealth Edison Co. established an experimental laboratory and invited its customers to submit any of their products for investigation.

During the past 18 months over 200

different processed or semi-processed materials have been brought in for test, the items ranging from armatures to popcorn, from golf clubs to hog medicine, and so great has been the success of the experiments that Commonwealth Edison engineers incline to the belief that there are few, if any, manufacturing operations involving the use of heat, to which high-frequency current cannot be applied.

Fig. 1 shows a familiar domestic article, the common hairpin, which comes 100 pieces to the pound. One

manufacturer is making 7000 lb per 8-hr day, and each pin must be tempered to the point where the prongs may be spread apart 1¼ in. and spring back flat. The traditional method has been to place the pins on racks, and heat treat in a convection oven. With induction heating, however, the racks may be passed through an 18-in. coil and raised to the desired temperature of 550°F in 0.5 sec.

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The sintering of a powder metal ring containing diamond particles to form a grinding wheel, is another operation normally requiring considerable time and a fairly high temperature furnace. By means of induction heating the material was brought to the required temperature of 1400°F in 10 sec.

In the manufacturing of a small electric motor, it was required that the armature be preheated before dipping in insulating varnish, then reheated to bake the varnish. In a convection oven, 8 to 10 hr were required for the operation. For induction heating, a six-turn coil was employed, and the preheat temperature was attained in 1 min. Parts were then dipped and replaced in the coil, and power turned on for 2 min to bring them to curing temperature, after which baking was accomplished by means of the residual heat.

This application of high-frequency heating for preheating before impregnating would seem to offer an interesting new field, since there are innumerable items which require impregnation. In every case, heating before impregnating will increase the depth of penetration, and heating after impregnating will prevent case hardening, brought about by premature surface hardening.

Local heating for hardening is a sufficiently familiar process, but fig. 2 shows an unusual application in which two small areas of a nickel silver punching were required to be heated to 700°F to facilitate a subsequent folding operation. A single turn around each point was found to do the job in 16 sec.

Unusual, but very ingenious is the application shown in fig. 3. Here a bond was needed between the steel head of a golf club, weighing between 8½ oz and 10 oz, and the steel shaft.

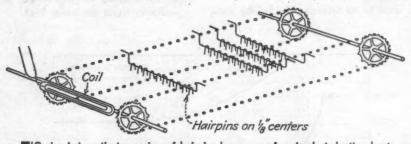
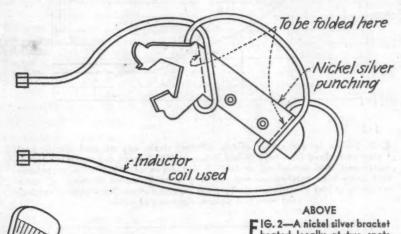


FIG. I—Automatic tempering of hairpins by means of a simple induction heating coil located at the end of a conveyor.



Steel head

LEFT

Fig. 3—Attaching the head of a golf club to the steel shaft by induction heating of the polyvinyl acetate bond is a novel application of the process.

Steel shaft

Frequency Heating

By E. D. TILLSON

Testing Engineer, Commonwealth Edison Co.

The tapered hole was coated with polyvinyl acetate, and the head heated to 350°F in 1 sec. After cooling the club was submitted to a very severe torsional test, and the bond pronounced unbreakable. Now in regular use, this method has the added advantage that no subsequent polishing is needed, as the heating does not in any way discolor the chromium plating.

The collapsible tubes shown in fig. 4 are of the type used for a wide variety of contents, from tooth paste to shoe cream. They are painted and printed by the roll-on process, and one manufacturer produces as many as 27,000 an hr. The problem was to dry the paint in less time than the 20 min required for each coat in a convection oven. A solution was found by placing the tubes over steel rods heated by induction to 400°F, and drying the paint on the outside by the heat dissipated from the rod on the inside. The time required was 2 min for each coat.

After the tubes have been filled they are sealed by folding and crimping at the bottom, see fig. 5. Unfortunately, a certain percentage of these folds later open up, so that when the user squeezes the tube the contents come out at the wrong end. To avoid this. the inner faces have been coated with a plastic bonding material, folded, and heated to 250°F by a single turn coil and loose coupling. Time required, 1 sec. Attempts have been made to heat the crimping dies by gas or other means, but the operation is quite tricky because of the thinness of the metal and its tendency to stick to the heated dies, with the result that the fold opens up when the dies are retracted. With induction heat, of course, which requires no physical contact, this is avoided.

Steel banding strap such as is used for binding and sealing packing cases is made from SAE 1010 steel 0.022 in. thick by % in. wide, and is required to be blued on both sides and both edges. This was done originally by heating the strip to 650°F in a lead bath 30 ft long, containing 100 tons of lead. Now the process has been changed over to induction heating by passing the strip through a flat coil of 18 turns, and bluing it at the rate of 2 ft per sec. For a daily production of 264,000 ft of strap, an electri-

... Believing that induction heating was not sufficiently known or used outside the regular metal working industries, Commonwealth Edison Co. set up a testing laboratory for the benefit of its customers. Some of the interesting and unusual applications devised are described in this article.

cal demand of approximately 80 kw would be entailed.

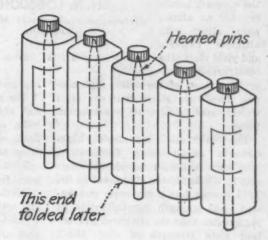
Fig. 6 shows a mold for centrifugal casting of steel parts. A heavy sheet metal cylinder encloses a sand mold which in turn surrounds a polystyrene pattern. Induction heating is applied to the cylinder to melt the pattern and

leave the appropriate cavities. To prevent explosions in the mold from the presence of excessive water and alcohol, it was found necessary to apply heat gently at first, and in the particular example illustrated, four 1-min cycles separated by 1-min inter-

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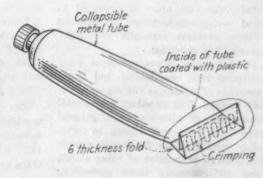


FIG. 4—The paint on the outside of toothpaste containers is dried by means of the inductively heated pins which support the tubes.



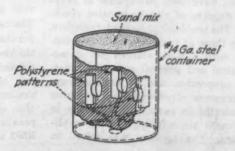
RIGHT

FIG. 5—A new wrinkle for sealing the ends of toothpaste tubes consists of heating the plastic coated ends with an induction coil before folding and crimping.



RIGHT

FIG. 6—Induction heating to melt polystyrene patterns out of centrifugal casting molds saves more than an hour over conventional methods.



Aluminum-Alloy R303

... This new high-strength alloy, with a well-balanced set of mechanical and general corrosion-resistant properties, will likely find many postwar applications. The physical properties, heat treatment, etching techniques, corrosion characteristics, and formability are all described herein.

alloy was developed during the past year to meet the expressed need of the aircraft industry for an aluminum alloy with ultimate tensile and yield strengths considerably great-

er than those of the older, high-copper, dural-type alloys that are most widely used in aircraft construction today.

The aircraft industry's highstrength requirements, fortunately, have been met with considerable success in R303; for the clad sheet in the T275 temper has a minimum guaranteed yield strength approximately 64 pct greater than the minimum guaranteed yield strength of clad 24S-T sheet. Although developed for war needs, particularly for military aircraft, the new alloy is expected to find many peacetime applications where greatest strength and light weight are essential.

R303 is an aluminum-base alloy utilizing zinc, magnesium and lesser amounts of copper as the major alloying metals. The excellent mechanical properties of alloys of this general type have been well known to lightalloy metallurgists for many years; but a large proportion of these alloys, and unfortunately those possessing the most interesting mechanical properties, have been susceptible to varying degrees of stress-corrosion cracking. The problems presented, therefore, were those of finding a basic composition with a well-balanced set of mechanical and general corrosion-resistant properties, and of finding ways to suppress stress-corrosion cracking sufficiently to permit its safe use in the usual aircraft engineering applications. The problem was solved in

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L. E. HOUSEHOLDER
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and

H. N. LOGSDON

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Louisville

special heat-treating and aging practices.

The new alloy is produced in plain and clad sheet, in plate, bar, rod, wire, extruded shapes and forgings. Each of these forms is supplied in

turing

R303 by carefully

balancing all alloy-

ing constituents,

by introducing

stress - corrosion

cracking inhibitors

into the composi-

tion, by using im-

proved manufac-

and by developing

processes

three tempers designated as follows: R303-0—Annealed temper for maximum formability.

R303-T315—Solution heat treated and artifically aged for 8 hr at 315°F. R303-T275—Solution heat treated and artifically aged for 25 hr at 275°F.

In addition, forging stock is supplied in the as-fabricated condition.

Table I lists the typical and the guaranteed minimum tensile properties of the various products in their three tempers. Other typical mechanical and physical properties are reported in table II.

The recommended solution heattreating temperature range for R303 extends from 810°F to 840°F (825°±15°F). Close adherence to these specified temperatures is necessary to obtain optimum resistance to all the usual types of corrosion as well as to stress-corrosion cracking. The necessary length of time at temperature, of course, depends on the thickness of the material being treated. In general, the soaking times are about the same as those for similar products in 24S alloy, except that considerably more time at temperature is permissible with clad R303 than with clad 24S.

No evidence of high-temperature oxidation has yet been detected in R303 products solution heat treated within the previously specified temperature range. sup

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After soaking at solution heattreating temperatures for the time necessary to obtain solution of the soluble constituents, R303 may be quenched in either cold water, hot (160°F) water, or light oil at room temperature. Although the slower quenching rates will result in somewhat lower strength properties, they have not shown any effects on the resistance to corrosion after subsequent artificial aging. In fact, some tests have indicated improved resistance to stress-corrosion cracking with the slower quenching rates.

Following the quench from solution heat treatment and prior to artificial aging at elevated temperatures, an incubation or natural room-temperature aging period of at least 24-hr duration is required in order to obtain maximum strength.

The recommended elevated temperature aging practices for the two "T" tempers are as follows:

Alloy and Temper Aging Practice

R303-T315 8 hr at 315°±5°F

R303-T275 25 hr at 275°±5°F

These aging practices have been developed to obtain good mechanical properties along with best resistance to general and intergranular corrosion as well as best resistance to stress-corrosion cracking. Somewhat higher tensile strengths can be secured with lower aging temperatures; but unless excessively long aging cycles are employed with temperatures appreciably below 275°F, susceptibility to stress-corrosion cracking is increased. An aging curve at 275°F is shown in fig. 1, and similar curves at 310°F and 320°F, which include the temperature range for aging the T315 temper, are shown in fig. 2.

Annealing Slightly Different

Material quenched from the solution heat treating temperatures and naturally aged at room temperatures is in a condition defined as the "W" temper. Inasmuch as solution heat-treated and quench R303 will continue to age harden for protracted periods

of time (fig. 3), it is not practical to supply the alloy in this condition. However, the tensile properties immediately after quenching and for several hours thereafter show that considerable forming can be done at this time.

The annealing practices for R303 differ only slightly from those employed on other heat treatable aluminum alloys. To relieve hardening induced either by thermal treatments or cold work, the alloy should be held at 675° to 700°F for 2 hr followed by air cooling to 450°F and by soaking at this latter temperature for 4 hr.

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The preparation of metallographic specimens of R303 alloy is not difficult when proper technique is employed. In general, those procedures which will afford a satisfactory polish to the duralumin type alloys will give acceptable results without modification. However, care must be taken to insure adequate cutting action on the abrasive papers and during intermediate polishing.

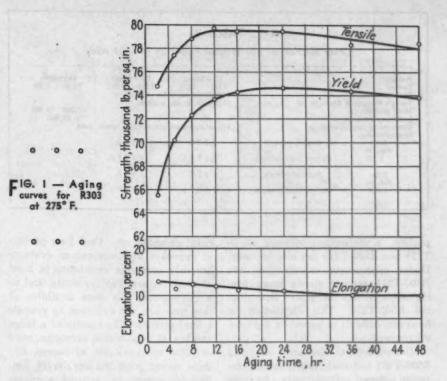
Two etching reagents are recommended for R303 alloy, one for the annealed condition; the other for the solution heat-treated and the aged conditions.

The microconstituents of the annealed alloy (R303-0) are revealed by the use of an etching reagent reported by William L. Fink and L. A. Willey (1): H2SO4H2S reagent

Solution A = 1 pct sulfuric acid (H2SO4) Solution B = 0.1 pct sulfuric acid saturated with hydrogen sulfide (H2S)

Etching is accomplished by immersing the specimen, polished surface up, in solution A for 3 sec. The specimen is then transferred directly to solution B and immersed for 60 sec. after which it is rinsed in warm water and blown dry. These solutions are used at room temperature and solution B should be made up only as it is needed.

The microstructure of the solution heat treated (R303-W) and the solution heat treated and aged (R303-T275 and R303-T315) conditions can be revealed very satisfactorily by employing an etching reagent developed in the laboratories of Rey-



nolds Metals Co. by H. N. Logsdon and L. E. Householder: HNOs-CHsCOOH reagent

> Nitric acid (conc) 1 cc Glacial acetic acid 5 cc Water (distilled)

Etching is accomplished by immers-

94 ec

ing the specimen at 158°F for 30 min, after which it is rinsed in warm water and blown dry.

This etching reagent is used to distinguish between the solution heat treated (R303-W) and the solution heat treated and aged (R303-T275 and R303-T315) conditions.

Using a known solution heat-treated and aged-temper specimen for com-

TABLE I Typical and Guaranteed Minimum Tensile Properties of R303 Alloy

Links Co.	Typical			Tentative Guaranteed Minimum			
241 pt 26713	Tensile, PSI	Yield, PSI	Elongation, Pct in 2 in.	Tensile, PSI	Yield, PSI	Elongation, Pct in 2 in.	
Clad sheet ¹ 0 temper T315 temper T275 temper	29,000 72,000 75,000	14,000 65,000 69,000	18 9 10	35,000 ² 67,000 70,000	60,000 64,000	10 7 7	
Bare sheet ¹ 0 temper	30,000 75,000 79,000	15,000 69,000 73,000	18 9 9	35,000 ² 70,000 74,000	65,000 69,000	10 7 7	
Extrusions 0 temper	30,000	15,000	18	35,0002		12	
0,040 to 0,600 in, thick T315 temper T275 temper	79,000 85,000	73,000 80,000	9 9	72,000 77,000	87,000 72,000	7 7	
0,601 in, thick and heavier T315 temper. T275 temper.	82,000 89,000	77,000 84,000	11 10	75,000 80,000	70,000 75,000	8 8	
Rolled rod (up to 4 in.) ³ 0 temper T315 temper T275 temper	30,000 75,000 79,000	15,000 69,000 73,000	24 14 14	35,000 ² 70,000 74,000	65,000 68,000	16 10 10	

[&]quot;Equilibrium Relations in Aluminum-Magnesium-Zinc Alloys of High Purity," by William L. Fink and L. A. Willey, Institute of Metals Div. American Institute of Mining and Metallurgical Engineers (1937).

All properties cross-grain.
 Maximum.
 Typical properties of forgings are the same as for rolled rod, when specimens are parallel to grain flow.

TABLE II Other Mechanical and Physical Properties of R303 Alloy

Temper Density Young's Modulus of Shear strength, psi Endurance limit, ps	Elasticity, psl	Clad Sheet T315 T275 0.102 lb per cu in 10,400,000 for all	products	Extrusions T315 T275 47,000 48,000 22,500
Compressive yield s Bearing values:	trength, psi		the same as tensile	yield_
Edge distance	Bearing strength	1.5 T.S.	1.5 T.S.	*****
1.5D	Bearing yield strength	1.4 T.Y.S.	1.4 T.Y.S.	
Edge distance	Bearing strength	1.9 T.S.	1.9 T.S.	
2.0D	Bearing yield strength	1.6 T.Y.S.	1.6 T.Y.S.	

parison, a distinction between R303-T275 and R303-T315 can also be made. Under microscopic examination, the R303-T315 temper shows more precipitation within the grains than does the R303-T275. This distinction is, however, difficult to reveal in a photomicrograph.

Microstructural features of clad R303-T275 and clad R303-T315 are revealed very satisfactorily by the HNO3-CH3COOH reagent. Microscopic examination of cross-sections provides a very effective means of determining the thickness and continuity of the cladding and the extent of diffusion of the soluble elements from the core into the cladding during solution heat treatment.

Resistance to Corrosion

The corrosive environments to which high-strength aluminum alloy structures, particularly aircraft frames, are most frequently exposed are sea water, marine, industrial and

rural atmospheres. Very long periods of exposure are required to evaluate properly corrosion resistance in most of these natural environments, and as a consequence the data available at this time are not sufficient to provide a final picture. The results of a large number of accelerated corrosion tests on R303 are available, of course, and these along with the results of limited exposures to natural environments justify the following tentative conclusions.

Unprotected R303-T315 possesses considerably better resistance to general corrosion than unprotected 24S-T in similar products. The resistance to stress-corrosion cracking of the alloy in the "T315" temper is sufficient to enable its safe use under conditions of exposure which would cause dangerous deterioration in 24S-T as a result of general and intergranular attack. In the T275 temper, the alloy possesses degrees of resistance to general corrosion and stress-corrosion

cracking sufficient for its utilization where 24S-T is satisfactory. To date. unprotected cantilever-type specimens of 0.064 in. thick sheet, designed to give a uniform stress in the outer fibers by dead-weight loading, have not failed after 1600 hr in the standard salt spray test at 95°F, when stressed as high as 90 pct of the yield strength. These tests are still in progress and will be continued to destruction.

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R303 in both T tempers is markedly superior to 24S-T in resistance to intergranular corrosion. Quenching rates are not critical as far as resistance to intergranular or stresscorrosion cracking are concerned. General corrosion in salt-peroxide solution is accelerated by stress somewhat more in T temper material produced by quenching in fight oil and hot water than in T temper material produced by quenching in cold water as specified for 24S-T. Nevertheless the resistance to acceleration of general corrosion by stress obtained with the slower quenches is good enough to justify the use of light oil or hot water quenches where troublesome distortion in cold water quenching is encountered.

Some data are given in table III which compares resistance to corrosion of R303-T275 and R303-T315 with 24S-T, as revealed by an accelerated corrosion test. In every case the loss in tensile strength of R303 is appreciably less than for 24S. The percentage change in elongation is rather erratic due to the fact that the specimens were machined prior to corrosion, and small corrosion pits at the edge of the specimens resulted in points of stress concentration and thus rather inconsistent breaks. Although these data do not show any significant difference between the two T tempers, prolonged exposure under less severe conditions indicate the T315 temper to be appreciably more resistant than the T275 temper.

Susceptibility to intergranular corrosion of R303 in the W temper is about the same as, or slightly more pronounced than, in 24S-T. As with 24S-T, susceptibility to intergranular attack in R303-W is increased by slow quenching. R303-W is also susceptible to an exfoliation type of attack not usually encountered in the dural class of heat treatable aluminum alloys. Inasmuch as the use of R303 in the W temper offers no marked advantages over 24S-T, its extensive use in this temper can hardly be anticipated; and as a consequence, the subjects of intergranular and exfoliation corrosion

TABLE III Effect of an Accelerated Corrosion Test on Tensile Properties of 24S and R303

Product	Thickness,	Pct Change After Corrosion ¹							
		R303-T275		R303-T315		24S-T			
		T.S.	Elongation	T,S.	Elongation	T.S.	Elongation		
Sheet Sheet Sheet Sheet Sheet Sheet	0.020 0.040 0.051 0.064 0.081 0.102 0.156	-3.3 -2.9 -0.7 -0.6 -1.6 -1.4 -2.1	64.5 58.7 19.4 18.7 40.0 31.9 51.5	-4.2 -4.8 -2.1 -1.0 -1.7 -0.3	-64.5 -63.3 -33.3 -20.0 -36.4 -29.1	-21.3 -10.0 -12.6 -7.7 -7.1 -4.1 -6.9	-20.6 -46.3 -48.9 -45.4 -41.4 -49.2 -50.0		
Extrusions Extrusions Extrusions Extrusions Extrusions Extrusions Extrusions	0.040 0.080 0.098 0.190 0.440 0.500 ²	-1.0 0 -0.3 -0.9 0	-33.8 -11.1 -6.7 -10.3 -3.0	-0.6 -1.8 -0 -0.7	-19.3 -15.0 -5.6 -7.0 -3.7	-6.1 -5.9 -5.0 -2.4	-32.1 -32.0 -22.8 -16.2		

¹ Each result is based on the average of three tests before and after corrosion. The procedure and solutions, outlined in specification AN-QQ-H-186a, were used with exception of the time which was 24 hr.

² These specimens were standard ½ in. round specimens, machined from extrusions of ¾ to 1 in. in thickness.

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All tests to date indicate that the new alloy in the annealed temper possesses at least as good resistance to all types of corrosive attack as does the alloy in the T315 temper.

The resistance to corrosion of the clad sheet, especially in the T tempers, is excellent. In this respect, clad R303-T315 and clad R303-T275 are similar although slightly superior to clad 24S-T. The effects of diffusion of the alloying elements of R303 into the cladding on resistance to corrosion are much less pronounced than the effects of copper and magnesium diffusion in clad 24S-T. For example, samples of 0.064 in. thick clad R303-T275 sheet that had been held at heat-treating temperatures for a period of 24 hr showed no significantly greater losses in mechanical properties after exposure to the standard, accelerated, salt-peroxide corrosion test, than did samples of the same sheet held at heat treating temperatures for a period of 20 min in accordance with normal practices. These data are given in table IV, along with data which compare the corrosion resistance of bare and clad R303 sheet.

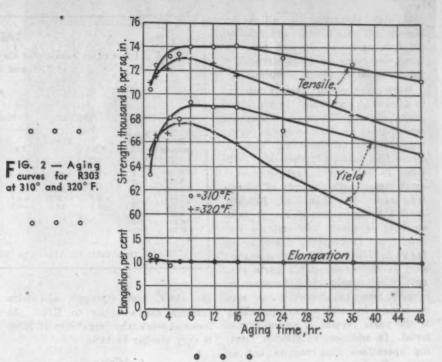
Galvanic section, provided by the more electronegative solution potential of the cladding alloy, protects the R303 core alloy against stress-corrosion cracking, as well as against the intergranular and pitting types of corrosive attack. Thus far, no stress-corrosion cracking has been detected in highly stressed, plastically deformed clad R303 sheet exposed either to natural, or to the most severe artificial environments.

The usual painting and anodizing protective measures that have been found satisfactory for plain and clad 24S-T in their various applications should also be satisfactory for comparable R303 products in corresponding uses.

Formability

So far the tests employed to compare the formability of R303 with other aluminum alloys have been the 180° laboratory bend tests and the Erichsen cup-drawing tests. These tests can only serve as guides for the various shop forming tests that are required to establish standard practices in any particular plant.

The minimum bend radii and the Erichsen cup test values for R303-0 are very similar to those for 24S-0. In view of these latter similarities and the similar tensile and yield

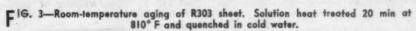


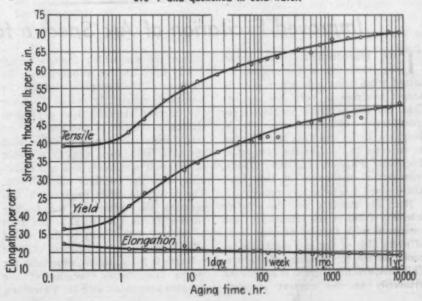
strength values for 24S-0 and R303-0, little if any difference should be noted between the practical shop forming practices for the two materials.

As a consequence of their much higher tensile and yield strengths, R303 sheet products in their T tempers are, in general, less workable than 24S-T sheet products. Bend radii for R303-T315 have to be increased by about 2T over those used for 24S-T. The necessary increases in minimum bend radii for R303-T275 over those for 24S-T are slightly greater than the increases necessary for R303-T315, and may approach 3T for some types of forming.

Erichsen cup-test values for R303-T315 are only slightly smaller than those for 24S-T sheet, and for R303-T275 they are, in turn, somewhat smaller than similar values for R303-T315.

The formability of freshly quenched R303 sheet is excellent. The slower age-hardening characteristics of R303, as compared with freshly quenched 24S sheet, offer greater convenience in utilizing the good forming qualities of freshly quenched material. The amount of plastic deformation induced in freshly quenched R303, however, will no doubt be limited more by the final strength requirements than by its capacity to absorb





cold work; because, like all A1-Zn-Mg-Cu alloys, plastic deformation, prior to aging at elevated temperatures, decreases the yield strength of the material in the T tempers.

More experimental work is required to determine accurately the maximum limits of cold deformation that are permissible for the various aging temperatures. Preliminary tests indicate that losses of practical significance in final yield strength do not occur either with amounts of plastic deformation less than 3 pct followed by 315°F aging for 8 hr, or with amounts of plastic deformation less than 7 pct followed by 275°F aging for 24 hr. Use of the freshly quenched alloy is recommended for parts that require relatively mild forming in order to avoid any distortion that may be caused by cold water quenching of the parts formed in annealed material. In addition, in difficult forming operations that require one or more softening treatments, a solution heat treatment is recommended for final softening prior to a relatively mild finish forming operation. This expedient will also avoid distortion frequently encountered in the heat treatment of formed parts, and will eliminate difficult straightening processes.

Forging

R303 press forges and hammer forges readily in a temperature range extending approximately from 750° to 800°F. An optimum forging temperature usually exists for every combination of forging shape and type of forging operation. The optimum temperature for any given combination of factors usually has to be determined by actual tests. The general principles governing die design for

TABLE IV

Effect of an Accelerated Corrosion Test on Tensile Properties of R303 and Clad R303 Sheet

Heat- Treat Soaking Time, Min	100	Pct Change After Corrosion								
		R303-T275		R303-T315		Clad-T275		Clad-T315		
	Soaking Time,	T.S.	Elonga- tion	T.S.	Elonga- tion	T.S.	Elonga- tion	T.S.	Elonga- tion	
0.020 0.032 0.040 0.051 0.064 0.064 0.064	20 20 20 20 20 20 480 960 1440	-3.3 -2.9 -0.7 -0.6	-64.5 -58.7 -19.4 -18.7	-4.2 -4.8 -2.1 -1.0	-64.5 -63.3 -33.3 -20.0	-1.8 -0.5 0 0 -0.5 -0.7 -0.9	-3.0 0 0 0 0 0	-1.4 -0.8	-3.3 -7.2 0 0	

Note 1 from table III applies to this table also.

the older, high strength, aluminum forging alloys apply to R303. In hammer work, the forgability of R303 is very similar to 14S.

Joining

Spot welding of clad R303 sheet offers no unusually difficult problems. Strength requirements for clad 24S-T spot welds can be met with clad R303 spot welds. Clad R303, however, requires flatter tip contours, greater tip pressures and a slightly narrower range of machine settings than does clad 24S-T. The usual care required in surface preparation of other aluminum alloys is also necessary for clad R303. Satisfactory surface cleaning may be accomplished by rubbing with steel wool, by brushing with wire brushes, or by the use of chemical solutions.

The corrosion resistance of spot welded clad R303 in the T tempers appears to be just as satisfactory as the corrosion resistance of spot welded clad 24S-T. Spot welding of unclad R303 in the T tempers is not recommended for aircraft use because of the localized change in solution potential which is induced by the heat from the spot welding operations. Preliminary tests, however, indicate that, if spot welded joints in bare R303 are subsequently heat treated and artificially aged, satisfactory resistance to corrosion can be secured. Solution heat treatment and artificial aging after spot welding, obviously, are feasible only with small assemblies.

Torch welding of R303 presents problems very similar to those encountered in torch welding the high-copper, strong alloys. Until further research solves these problems, general torch welding of R303 is not recommended.

Riveted connections provide the most efficient joints in the new alloy. The high bearing strengths of R303, moreover, permit the use of the increased shear design values recently authorized by the Army Air Force for A17S-T, 17S-T and 24S-T rivets.

Improved Excitation of Arc Spectra for Spectroscopes

THE reproducibility and, hence, the reliability of the results obtained when using a dc arc in spectroscopic analyses is very low, so low that the arc is little employed for quantitative determinations. I. V. Belyakov-Bodin and S. L. Mandelstam, as reported in the Russian Journal of Technical Physics, 14, 400 (1944), investigated the cause of this fault and devised a satisfactory remedy.

Both the absolute and the relative intensity (that is, the intensity of one compared with that of another line) of every line of the arc spectrum depends on the temperature of the arc. This temperature in turn is dependent primarily on the current strength

within the arc which changes incessantly since the arc wanders over the surfaces of the electrodes and also its resistance constantly varies. To make the current strength less dependent on the resistance of the arc, the external resistance can be raised so that the total resistance, that is the sum of external resistance and arc resistance, does not oscillate too violently. The favorable effect produced by increasing the voltage of the feeding current (from 110v to 220v and even to 2000 to 4000v) may be due to this effect. However, utilization of high voltages is inconvenient, especially for works laboratories, because of the dangers associated with it. Therefore,

another way was sought and found.

The problem is to keep the current strength in the arc as constant as possible when the arc resistance varies. This can be achieved when the arc is fed from a special rectifier. To the rectifier an alternating current of 220v is supplied. The output voltage is 100v to 105v, and the strength of the output current is within a range nearly independent of the voltage drop in the arc circuit. In the rectifier described by K. Z. Rakhmatullin, Russian Journal of Technical Physics, 14, 404 (1944), the output current remains within the range 3.85 to 3.95 amp when the voltage drop varies between 10 and 45v.

Dimensional Control To Millionths

By RICHARD Y. MOSS

Production Engineering Manager,
Sheffield Corp., Dayton

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FIG. 1—During the grinding operation the operator inserts the gaging spindle three or four times to check hole size and to bring the part diameter to finish dimensions.

. . . Plunger and bushing manufacture for fuel injection equipment on the engines of B-29s late in the war was and is the most precise operation yet performed in mass production. Each grinding machine, equipped with flow-type air gaging equipment, turns out parts in quantity to a dimensional tolerance of 5 millionths of an inch.

Postwar requirements for extreme dimensional precision in volume manufacture of products with tolerances held accurate to millionths of an inch are practical and thoroughly sustained by wartime precedents. Dimensional control at grinding, lapping, superfinishing, inspection and assembly may be applied to mass production with assurance that "the sixth decimal place" in the product is practical and readily obtainable whenever field performance requires.

A major factor in the performance of certain aircraft during the later stages of the war was the use of direct fuel injection of high octane gasoline in the engines.* Most unproblems of producing the highly critical elements in very large volume were used at the Eclipse-Bendix plant at Elmira, New York.

It is interesting to consider the specified part tolerances in comparison with precision manufacturing practice. Except in gage manufacturing, tolerances ordinarily are not closer than 0.0001 in. In the fuel injection device, clearance between plungers and bushings in this assembly had to be controlled within the minute range of 0.000060 in. to 0.000080 in. Thus, 20 millionths of an inch was the total variation permissible in the fit between mating cylindrical parts. This tolerance was divided by two so that the permissible variation of either the hole or the cylindrical plunger was 10 millionths of an inch, plus or minus 0.000005 in.

Obviously, extremely precise temperature control was required in all finishing phases of the manufacturing operation because the thermal coefficient of expansion of the materials used in the mating parts was approximately 0.000006 in. per in. per F°. On a basic dimension of 0.5 in., then, the permissible part tolerances for straightness, roundness and size would be equal to about 3 F° temperature change.

The inherent errors of purely mechanical methods of hole measurement, and the difficulties of their use for checking parts while still mounted in internal grinders, practically precluded their successful use in this gaging application.

At about the time that the need for these manufacturing tolerances became apparent, the development of a high amplification flow type air gage for use in manufacture of master cylindrical ring gages was being completed by the Sheffield Corp., Dayton. It was found that this instrument could readily be applied to accurate measurement either of internal or external dimensions to the tolerances required, with gaging speed and ease of reading that would permit quick checks of taper, bell-mouth, roundness and size.

The basic principle of the flow type air gage used in this application is the same as that used in other Precisionaires of lower amplification which have been manufactured by Sheffield for a number of years. The air escaping from a pair of jets on the gaging spindle at a relatively constant pressure is varied by the amount of clearance between the spindle jets and the part itself. When the part is of a larger diameter, there is greater clearance and more air escapes.

The indication of variations in air flow is carried out by the position of the indicating float in a tapered glass tube. As more air flows, the float assumes a higher position in the tube,

usual production and inspection problems arose in the manufacturing of the necessary devices because of the previously unheard-of part tolerances called for in the specifications. However, methods and equipment found to be highly successful in solving these

^{*}Air-cooled engines of over 3000 hp used on the B-29, first announced in THE IRON AGE, issue of Aug. 2, 1945, p. 41. This was the first shift from conventional carburction in American aircraft engines, although Germany used the injection principle throughout the war.



FIG. 2—Two rows of internal grinders for finish grinding holes to a part tolerance of 10 millionths of an in. Each of the grinders is equipped with a flow-type air gage.

where there is greater clearance between its diameter and the inner wall of the tube. The high amplification Precisionaire, with extensive refinements of these details, indicates very positively and rapidly part variations as small as a millionth of an inch.

At the Eclipse-Bendix plant more than two hundred gages were used, with a required duplicate performance within 3 millionths of an inch on hourly checks against calibrated master rings. The commercial variation permissible in Class "A" gage blocks is 0.000004 in. on blocks of dimensions less than an inch. In order to maintain part tolerances within the limits required for this job it was necessary to calibrate master ring gages to limits somewhat closer than were

these standard gage block tolerances.

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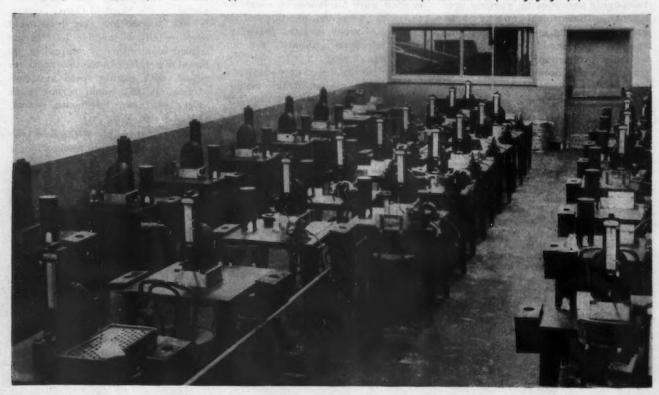
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The standard practice developed in this instance was to scribe a line on one face of a cylindrical ring gage and to take the calibration measurement at the middle of the ring gage's bore length parallel to the line scribed on the face.

Thus, the size marked on a ring gage was the single diameter of the

Fig. 3-All rejected parts are hand lapped here for correction. Each woman operator has complete gaging equipment.



ring measured with the greatest possible accuracy. These calibrated masters were then used in hourly checks of all the air gages used throughout the grinding, lapping and inspecting phases of production. The results of the readings on each instrument were recorded and adjustments made in any instance where the instrument reading varied more than three millionths from ring calibration size.

All master rings were mounted in non-conductive brackets to prevent misreadings caused by the thermal expansion due to inspectors' handling of the rings. The internal grinding machines used to grind the several hole lengths of bushings in the product were operated to grind to within 100 millionths of low-limit finished hole size on a semiautomatic cycle basis.

At this point the machine operator would use the Precisionaire to check the condition of the hole, checking at that time for out-of-round, taper and bell-mouth. From the readings taken at this time the operator could readily determine what corrective adjustments might be required for finishing the hole to straightness within limits. During manufacture, parts were inspected at four successive stages to check for corrections and to bring the hole to size required.

In order to minimize part losses in grinding and finishing, it was found desirable to set up about sixteen size classifications 5 millionths of an inch apart, permitting thereby a total range of part diameters 80 millionths

It was still necessary at any size step within this selection range that the part be round and straight within the 10 millionths limit previously mentioned. The size, however, was permitted to vary to permit assignment into any one of these 16 steps of 5 millionths each.

As a result, it became possible for the grinding machine operators to correct parts out-of-tolerance by discovering the error while the part was still in the machine and grinding to a size class several steps larger. The ground holes were inspected with the same type of Precisionaire instrument and the same gaging spindle. Similar calibrated masters, subject to the same checks as those employed on the grinding operations, were used.

Parts found to be out-of-round in excess of 10 millionths, or which were tapered, were in most cases salvaged by corrective lapping. Each lapper was supplied with the same measuring equipment. A single measurement is positively determinable in less than 2 sec after the part has been

positioned at the location where the various bushing members of the prodmeasurement is desired.

Throughout the use of the Precisionaire for the many measurements on schedules which call for hundreds of thousands of parts, it was necessary to maintain meticulous cleanliness of parts, gages and inspection The instrument literally masters. helps itself in extremely close measurements of this type by blowing away occasional particles of grit or lint which easily interfere with accuracy to such limits.

A total finished range diameter of about 80 millionths was permissible. at the final inspection position, but roundness and straightness had to be controlled within 10 millionths tolerance so that in assembly with the bushing the permissible clearance variation would not be exceeded.

A most interesting multiple application of air gaging was used with marked success on the plungers. The finished plunger of single diameter

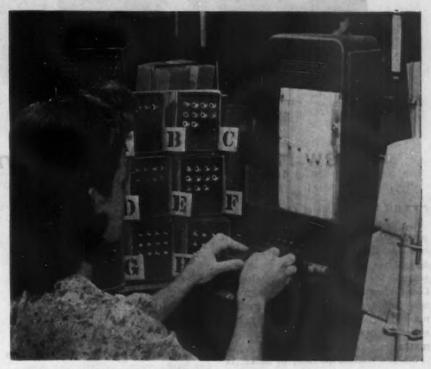


FIG. 4—A 5-tube Precisionaire for checking the plunger in five places simultaneously. If all five floats come between the two horizontal lines near the center, the part is considered straight.

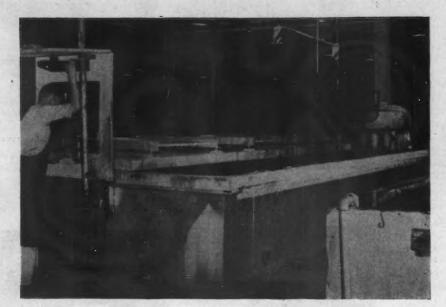
It was generally established that it was desirable to wash the hole to be gaged at the grinding, lapping or inspection operation, with a volatile solvent and then to wipe the hole with lint-free rayon cloths. By using this cleaning method prior to measurement, it was found that any variations due to the occurrence of dirt in the hole could be positively elimi-

An exactly parallel approach was followed in the gaging practices on the conforming male parts. The plungers were checked by Airsnaps, using the basic Precisionaire at each stage of progressive centerless grinding and superfinishing operations, and also through corrective lapping when required and at all stages of final inspection. Permissible variations of male parts were held within the same limits as applied to the holes in the dimension is placed in gaging position at which five sets of measuring jets will indicate its size at five points along its length simultaneously.

A 180° rotation of the part at this position will indicate out-of-round at any of the five positions. By shifting the part to a stop at the opposite end of the recess in which it lies in the fixture, similar 180° rotation will then indicate out-of-round or variations in size for five additional axial positions. As a result of this combination of gaging elements, it is possible to measure for diameter and roundness in ten positions along the length of a part approximately 4 in. long in a matter of seconds.

The extreme simplicity of the high amplification Precisionaire has made it possible to use unskilled personnel and to complete the training required

(CONTINUED ON PAGE 160)



LOAD of heattreated aluminum alloys is being removed from this heat-treating tank in Consolidated Vultee's San Diego plant. The molten sodium nitrate has been neutralized with sodium acid sulfate.

New Heat-Treat Neutralizing Chemical

THE heavy demand for chromium compounds and other critical products used in neutralization of heat-treating baths for aluminum alloys has served as the spur in the search for substitute chemicals by Consolidated Vultee Aircraft Corp. It was found that sodium acid sulfate not only gives successful results, but saves approximately 75 pct in cost of materials.

Molten sodium nitrate, or niter, is commonly used by the aircraft industry as "liquid heat" in the heat treatment of aluminum alloys. The niter bath is operated at temperatures as high as 950° F. Since sodium nitrate starts to decompose at 720° F, there is a considerable breakdown of the salt at 950° F.

One of the end product from the sodium nitrate decomposition is sodium oxide which in contact with water produces sodium hydroxide, a strongly alkaline compound. Aluminum alloys are susceptible to corrosive attack in alkaline media. Some aluminum alloy parts, such as rivets, are heat treated after an anodic treatment, which forms a coherent absorptive film of aluminum oxide on the surface of the part to give protection from corrosion and furnishes better paint bonding. This coating also is attacked by alkalies.

The amount of alkali produced in a day by the decomposition of the niter may amount to as much as 0.005 pct. In order to neutralize this alkali, sodium dichromate, an inherently

By WILLIAM M. SUTHERLAND

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good corrosion inhibitor, is added to the bath.

Sodium acid sulfate proved to be a satisfactory substitute for sodium dichromate in niter baths. Commercial sodium acid sulfate assaying 80 pct and containing less than 2 pct moisture can be obtained readily and cheaply. This compound neutralizes the alkali produced in the bath by a straight acid-base reaction.

Neutral sodium sulfate is gradually built up in the bath as a byproduct. Water formed during the reaction goes into the gaseous phase at the temperature of the reaction. Additional sodium nitrate is added from time to time to make up for the salt lost by dragout when parts are removed from the bath. The concentration of the byproduct reaches an equilibrium at a point dependent upon the ratio of sodium acid sulfate to the niter added per unit time.

Splattering was encountered, at first, upon the addition of the sodium acid sulfate to the bath. The water content of the salt is a controlling factor of splattering; and a content

of less than 2 pct has been found to be safe.

Daily laboratory control of the alkalinity of the heat-treating baths is maintained by titrating a water solution of a weighed sample of the cooled salt with 0.1 pct sulfuric acid, using phenolphthalein as indicator. Each 0.1 ml of acid required to neutralize the salt indicates that 1 lb of sodium acid sulfate should be added to an average size rivet pot (containing 700 lb of niter) in order to neutralize the alkali present. The amount of sodium acid sulfate necessary to neutralize a bath is not stoichiometrically related to the alkali present, since considerable amounts decompose and vaporize at the surface of the bath before contact is made with the alkali.

Titration curves, prepared to study the buffer characteristics of a water solution of the salt, indicate that the addition of sodium sulfate narrows the pH range where buffer action takes place, but that the pH value where equinormal quantities of both sulfuric acid and sodium hydroxide are present during the titration is the same, pH 9. Phenolphthalein which has a range of pH to 10 is a satisfactory indicator for this titration.

Results of accelerated corrosion tests on aluminum alloys heat treated in a niter bath containing 10 pct sodium acid sulfate differed little from tests made on samples heat treated in niter baths containing sodium chromate.

Welded Construction

Reduces Die Cost

By JOHN MIKULAK

Welding Engineer,

Electric Machinery Mfg. Co.,

Minneapolis

SUBSTITUTION of welded dies, having a carbon steel body and a tool steel cutting edge, for conventional solid tool steel dies has for several years been the policy of Electric Machinery Co., Minneapolis, and has yielded excellent results by reducing first cost and increasing die life. Experience has shown that an 11-in. diam die fabricated by welding will cost only 65 pct of the cost of a permanent tool steel die, while for a 32in. die the cost will drop to 30 pct. When used for punching out core segments for electric motors and generators a high grade tool steel die will yield from 18,000 to 26,000 pieces between grinds, whereas, on the same part as many as 35,000 to 50,000 pieces can be obtained from the welded

Fabrication of welded dies is not difficult if the correct procedure is followed. The important factors to be observed are uniform temperature and careful welding to assure a good, sound weld. For dies up to 18 in. in diam the blank is torch cut from 1½-in. SAE 1020 or SAE 1025 steel plate; for dies 18 in. to 32 in. in diam 1½-in. plate is used. Generally somewhat higher carbon content is recommended for this application, but the lower carbon content has given excellent results and tends to reduce difficulties with cracking in the fusion zone.

The blank is annealed by heating to 1150° F, holding for 1½ hr, and then cooling to 500° F in the furnace before removing to room temperature. It is then rough machined to size, leaving approximately 1/32 in. all around, and a J groove is cut at the working edge to receive the hard surface weld deposit. This groove is similar to a J groove used in butt welding, and has a radial width of cut of from 9/32 in. to 5/16 in., and a length of from ½ in. to % in. The bottom of the J is made with a 5/32 in. radius.

The welding jig consists of a %-in. plate disk somewhat larger than the die blank, welded to four legs approximately 8 in. high. These legs are bolted or tacked to the motorized positioner table, and are necessary to provide clearance for applying preheat to the bottom of the plate to maintain uniform temperature throughout the blank. The blank is held on the jig by means of guide blocks welded to the top of the plate.

The work is preheated to approximately 300° F, heat being applied simultaneously to the top of the work and the bottom of the jig plate to assure uniformity. Temperatures may be checked by means of Tempilstiks, but it is extremely important to see that all surfaces of the blanks are up to the correct heat. A bead of mild steel weld is then deposited adjacent to the periphery of the working edge at the bottom of the J groove. For this purpose a Class B rod (AWS)

6012), such as Fleetweld No. 7, is employed. The welding is done in the flat position with 100 amp, and a 5/32-in. rod. In cases where a higher carbon steel is used, or where the quality of the plate is not definitely known, it has been found good practice to line the complete J groove with this rod, and also to run the bead at the top of the groove to overlap on to the plate. When this is done the radial depth of the groove must be increased 3/64 in. to allow for the extra thickness of weld.

After depositing the mild steel weld, the die is allowed to cool sufficiently to equalize temperatures, and then reheated to 400° F. From this point on it is very important to hold temperature as constant as possible. Welding should be carried on while plate temperatures run between 400° and 450° F, and it may be necessary to stop welding at times or at other times to preheat in order to maintain

FIG. I — Roughturned die blank showing J groove machined at outer periphery for receiving the Toolweld deposit.



this temperature. It is advisable, also, that the welding be done in an area free from excessive drafts.

In depositing the hard surface weld it is important to weld with a speed that will allow the arc pool to stay open long enough to work gases and slag up through it. Welding slightly uphill will facilitate such removal of gases and slag. Care should be taken not to weld too fast or porosity will result, and it is advisable not to try for too much penetration, especially into the parent metal of the die blank. For the hard surface welding, Toolweld No. 60 electrode is recommended. The diameter should be 1/8 in., and the current 75 amp on the first pass adjacent to the parent metal or mild steel weld, increasing to 90 amp on succeeding passes, with reversedpolarity dc current. Each bead should be cleaned thoroughly, and if air chipper is used the air should be dry. Even if an air filter is installed on the compressor, it is advisable to use an additional filter at the welding station, since any moisture will cause high cooling rates and set up checks. If, during welding, the operator notices that he has porosity in the bead as the arc pool solidifies, he should mark the spot, and before another bead is deposited the porosity should be removed by grinding.

The Toolweld deposit should be completely applied in five or six layers, and three passes is the minimum to be used in each layer or in any direction through the weld. In the past, more layers were used, but it

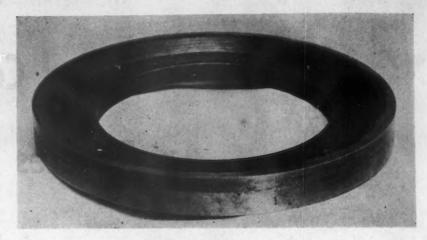


FIG. 2—Finish welded die after rough grinding, showing deposit at the outer

was found that this tended to produce cracks in the deposit. Care must be taken, however, that the deposit is built out far enough to produce the cutting edge without additional welding.

Reheating welded dies presents certain cracking hazards, but these can be avoided if the part is brought up to heat in a furnace very slowly and out of direct contact with the flame. If reheating must be done with a torch, the operation should start with a small flame applied directly on the weld deposit, and later applied to the deposit and die blank simultaneously.

When welding is completed the die should be covered with two layers of 1/16-in. asbestos sheet, making sure that there are no openings to create drafts on local areas of the part, and allowed to cool to room temperature before removing the covering. No additional heat treatment is needed before using the die, since it should have a hardness of 62 Rc to 64 Rc if the above procedures have been followed.

Before grinding, the die should be allowed to age for four or five days, and the rough grinding should be done with a dry, soft wheel at a speed of 160 fpm and a wheel feed of 0.0015 in. Another aging period of six to eight days should elapse before finish grinding, at which operation the wheel feed should not exceed 0.0005 in. If keyway inserts are required, as in the die illustrated, they are made from tool steel and inserted before the final

grind. After finish grinding, the back of the die should be finished to make sure that it will rest perfectly flat on the holder and eliminate any bending stresses on the weld deposit.

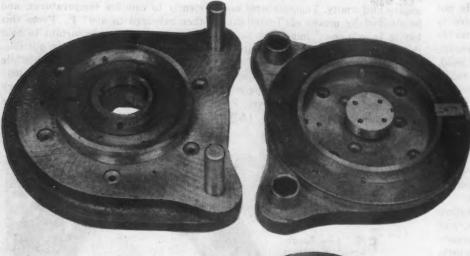


FIG. 3 — Welded dies mounted on die holders, with finished punching in foreground.

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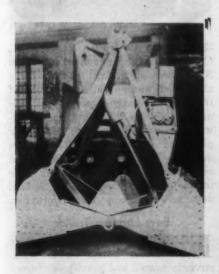


New Equipment...

Materials Handling

. . . Equipment for facilitating the handling of materials of all kinds, including trucks, conveyors, magnets, cranes, hoists and slings, is described in this week's review of manufacturer's announcements.

AHYDRO-ELECTRIC bucket operating on either AC or DC power has been announced by Victor R. Browning & Co., Inc., Willoughby, Ohio. It consists of an electric driven hydraulic pump which is connected to a cylinder and a ram, which in turn is connected to the bucket lips by means of a trunion in such a way that the movement of the ram opens and closes the bucket. Some advantages of this bucket are no sheaves,



cables or chains to wear out due to abrasive action of materials handled or to the lack of lubrication on all moving parts in the closing mechanism as this runs in an oil bath. The closing mechanism consists of a gear type pump and ram which will last indefinitely under ordinary service. There are no frictional devices or limit switches to get out of order as this feature is provided by the automatic relief valve. This bucket can be used without any head room required to close it, it can also be put into immediate service by simply hooking and plugging in the electric cable. It is also used in certain places where no means of closing a two-line bucket is available.

N Aire-Rectifier-on-Cab has been A announced by the Lintern Corp., Berea, Ohio. It is equipped with an air-cooled condenser and constitutes a complete assembly for attachment to existing cranes; entirely self-contained ready for fastening to the bridge structure. It is circular in shape with all excess bulk and weight trimmed off, and is made of steel and plastic construction. The cab has a capacity of 100 cu ft; receives 300 cu ft of recirculated air and 50 cu ft of new air per min, maintaining an outward pressure. This unit is intended for use only with the cab, and under conditions where temperatures do not exceed 1400 and radiant heat is not a factor. It introduces fresh air at the rate of once every two min and filters the air by both mechanical and electric heater,



thermostatically controlled, to maintain a temperature of 75° in winter operation.

Load-Carrying Truck

DESIGNED and built to carry heavy motors and generators, a motorized load-carrying truck has been announced by Lift Trucks, Inc., 2425 Spring Grove Ave., Cincinnati 14.

This new load-carrying truck is not a lift truck, the bed is stationarq. Heavy loads are placed on the truck by hand, crane or otherwise. Safety rated capacity is 4000 lb. Finger tip control permits easy maneuvering of the heaviest load forward or back to destination. This is a feature which provides easy starting and stopping. Finger tip control consists of two buttons on the handle, one for forward motion and one for reverse, operating in conjunction with a controller unit. It also has dynamic brake control.

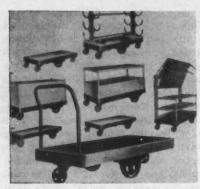


Conveyor Drive

CONVEYOR drive for motoriz-I ing gravity roller conveying equipment, known as power-pac, has been announced by Island Equipment Corp., 101 Park Ave., N. Y. 17. The drive is an assembled, self-contained unit which can be bolted to the chassis of any conveying equipment. It consists of motor, driving rolls, switch speed reducers, controls, gears and all mechanism to enable the user to make the proper connections to their equipment. It is ready to use after it is plugged into an electric socket. The main pillow block housings to which are attached the main drive rollers, being of special construction, allow ample lubrication at all times.

Industrial Truck

In addition to their line of materials handling equipment, the Market Forge Co., 80 Garvey St., Everett, Mass., has announced an industrial truck. This truck is equipped with deep stake pockets at each corner, and makes possible the complete conversion of the truck from one type of load-carrier to suit other requirements simply by the addition of standard available accessories. This truck is also designed for mass production



and has built-in features for safety, strength and utility. The adaptability of running gear, is also another feature.

Double Bucket Carrier

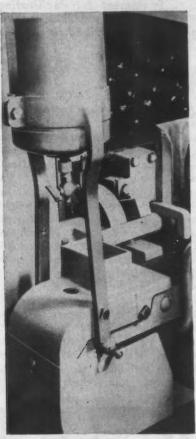
NEW motor-driven cab operated A double bucket carrier has been announced by the Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio, and is used for the transportation of dry bulk materials. The operation of the carrier and the opening and closing of the bucket gates are handled by the cab operator who sits on a swivel chair enabling him to work in the direction of either bucket. A single variable speed drum controller is located on one side of the cab, but two foot brakes are provided, one at either end so that one is always in convenient reach of the operator regardless of which direction he is operating the carrier. Push-pull levers for opening the bucket gates ex-



tend into the cab and permit emptying the materials in any amounts and at any rate desired. The buckets are designed and located with reference to the tramrail arch beam rail, so that they may be easily filled.

Lubricant for Conveyors

A LUBRICANT for high-speed chain conveyors has been announced by Turco Products, Inc., 6135 S. Central Ave., Los Angeles 1. This product, marketed under the name of Botlube, is non-staining, soapless, non-corrosive and contains no oil. It



has wetting action; one drop will quickly cover a very large area with a thin but exceptionally durable film. As a result, there is no overflow, no spillage or unsanitary soap pools on the floor. Such Botlube as may adhere to the bottom of bottles or cans will not stain surfaces. It is automatically dispensed through any simple container with a petcock and needle valve.

Hoist Drive

A HOIST drive for cranes known as the maxspeed system has been announced by the Industrial Engineering Division of the General Electric Co., Schenectady. This drive automatically measures the load so that it is hoisted and lowered at the maximum safe speed yet prevents the handling of dangerous overloads. It is designed for use on either indoor overhead, slow-speed cranes, or high-speed cranes of the type used in outdoor construction. In operation, heavy

loads are both hoisted and lowered at slow speeds, and light loads or the empty hook are hoisted and lowered at high speeds. Intermediate loads are handled at intermediate speeds, depending on the weight of the load. All braking is accomplished electrically, the power being returned to the supply system instead of being dissipated in resistors. A solenoid brake holds the load when at rest.

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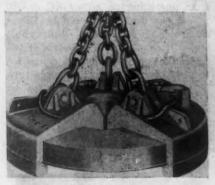
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Lifting Magnet

FOR general lifting magnet service, handling pig and scrap iron, slabs, castings and similar materials,



the Electric Controller & Mfg. Co., Cleveland, have announced the type SW-all-welded lifting magnet. The all-welded, water-tight construction of the type SW magnet permits its safe use in any service and in underwater salvage work, also in cooling pits and other applications where moisture is excessive. Enclosing the coil in metal case before placing same in the magnet-housing is a radical departure from conventional practice.

Easy Loading Trailor

QUIPPED with an all-welded structural steel framework, strongly braced and heavily reinforced to handle loads of 2½ tons easily, safely, quickly, an easy-loading trailer has been announced by E. R. Shile, of Palmer-Shile Co., 784 South Harrington St., Detroit 17. It is designed with an underslung frame which drops the platform down to within a few inches



from the floor, to provide a low center of gravity for easy loading from floor, skid or rack. On a platform, 38 in. wide by 78 in. long, heavy loads roll easily and safely on heavy metal wheels, rubber-tired and roller-bearing.

Oscillating-Trough Conveyor

NNOUCEMENT has been made A by the Link-Belt Co., Chicago, Philadelphia, of the Link-Belt Oscillating-Trough Conveyor for handling sharp, jagged, abrasive, wet, oily or hot material. This conveyor is made in two types, short hanger and long hanger. Some of its features are the handling of hot mill scale or conveying scrap steel away from the shears, for handling steel chips and turnings, together with the coolant, as they come direct from the machines. There is no spillage of material during conveying, as the conveyor action levels the material off like water. The conveying is done in a straight line, but separately driven sections of conveyor can be set at angles to each other, with one conveyor discharging into another. Conveying can be on a downward slope or horizontally. The conveyor permits discharge with less drop from one conveyor to a conveyor set at right angles than is required for a similar transfer of material between either belt or apron convevors.

Vat-Dumping Unit

A VAT-DUMPING unit which elevates and empties the filled vats within a few seconds, eliminating hazards and delays that formerly slowed the curing line, has been announced by Elwell-Parker Electric Co., Cleveland. In operation, the loaded vat is transported by means of a fork-type truck and placed in a steel cradle. The cradle is centered in a steel framework to which it is pivoted at its forward end. The



cradle with its load is tilted by means of gears and an electric motor. Brine and hams are discharged into another vat placed on a pallet or timbers, so that it may be readily lifted and transported by means of the fork truck.

Safe-T-Lift Slings

A COMPLETE line of safe-t-lift automatically equalizing chain slings made in 4 ton, 7 ton, 14 ton, 25 ton and 40 ton capacities has recently been announced by the *Hercules*



Sling Co., Rockford, Ill. This sling is a complete lifting assembly consisting of an equalizing unit and a continuous alloy steel chain. When load is being lifted and weight or pressure applied to sheave, a braking action takes place and unit is then frictionally locked until pressure is again released. It is said to be an insurance against chain sling failures because it eliminates the cause for placing unnatural strain on chains. The design is such that slippage is prevented by a built-in brake, and perfectly level lifting of the load is assured.

Wire Rope

W IRE rope that is covered with a green-colored lubricant, "Green-Lube," has been announced by the American Chain & Cable Co., Bridgeport, Conn. Only the highest grade of rope (preformed of improved plow steel), will be so lubricated. The non-preformed ropes made of improved plow steel will continue to be identified by a single green strand. The lubricant is said to have high viscosity and remarkable capacity for adhesion to the surfaces of the wires. It has a grease-like

consistency at normal temperatures and is applied hot and in a molten state by the pressure method which is said to not only assure complete coverage of every wire but the filling or "stuffing" of the voids between wires.

Permanent Magnet

PERMANENT magnet spout, type PM, has ben announced by the Stearns Magnetic Mfg. Co., Milwaukee 4. The automatic discharge of tramp iron which eliminates any manual cleaning operation is a principal feature of this spout magnet. Other features include positive opening and closing of the trap gate mechanism for discharging tramp iron; a double-gap magnetic field to attract even the smallest particles of metallic material. The magnet is held in operating position by magnetic attraction, eliminating latch arrangement. No outside electrical energy is required as a special magnet alloy steel provides a powerful magnetic field; no insulating shims are needed when mounting in hammer mills. These magnets are designed to fit a wide range of spout widths from 8 in. to 24 in. in standard sizes.

Roller Conveyor

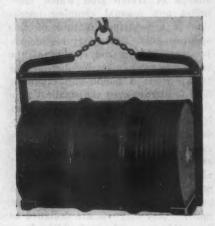
MATERIALS handling equipment for conveying pipe, tubes, rods and bars has been announced by John Moore Specialty Co., 6130 N. Hiawatha Ave., Chicago 30, and is called the Herculean Roller conveyor. It can be used as a single unit or in line, tandem fashion for trans-



ferring material from box cars to warehouse, from bins to threading machines and trucks. Is desirable in steel warehouses, forging shops, machine shops, pipe mills, and nipple shops. This conveyor is portable and has an adjustable swivel center post which raises the roller to a height over all of 51 in.

Toggle Type Barrel Cradle

An improved barrel cradle has been announced by Palmer-Shile Co., 784 S. Harrington Ave., Detroit 17, and is called toggle type barrel cradle. This cradle is said to be versatile, being able to pick up any shaped barrel or drum, with straight or bilged sides, and with flat or chimed ends. While primarily designed for handling barrels and drums, it can serve to pick up rolls of paper, carpeting or other cylindri-



cal packages. It has a capacity of 100 lb, and is made of heavy bar stock, welded construction. This cradle can be obtained in special sizes.

Crane Unit

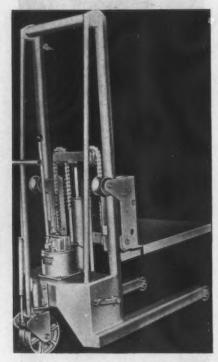
A COMBINATION dragline, clamshell and crane unit for tractor mounting, the Hystaway, has been announced by the Hyster Co., Portland, Oreg., and Peoria, Ill. This unit permits a working combination bull-dozer, dragline, clamshell and crane. This unit can be installed in two



hours. Full tractor mobility is retained as crawler track oscillation is not impeded by the unit; tractor rigidity when desired can be accomplished by a crank control at the mast head. Easily transported by dump trucks or flat-bed trucks the Hystaway can be taken from one job to another for tractor installation.

High-Lift Truck

EMPLOYING the same light-weight welded tubular and formed plate construction used in their 1000 lb capacity unit, Lyon-Raymond Corp., 2398 Madison St., Greene, N. Y., have added a 2000 lb capacity Hydraulic High-Lift truck



to their line. Its light weight, about one-third less than conventionally designed portable elevators, makes the truck suitable for transferring materials as well as for stacking and tiering.

Industrial Tractor

GASOLINE powered industrial tractors are again being pro-

duced by Towmotor Corp., Cleveland, following a four-year halt in production caused by the necessity of concentrating on lift trucks. The new model announced is said to have several outstanding design and construction features, and to be capable of pulling any

load that can be placed upon industrial type trailers. Compact and maneuverable, it is well suited for working in confined areas as in narrow factory aisles, up ship gangplanks and in and out of railroad cars. The new unit embodies numerous safety features, and eliminates many hazards in moving materials.

Dolomite Charging Belts

N improved method for construct-I ing small conveyor belts for charging dolomite into open hearth furnaces has been developed by Goodyear Tire & Rubber Co., Akron, Ohio. To prevent the belt wearing out at the splices, the method involves building the synthetic rubber belts without splices, assuring wear at the same time over the entire surface of each belt. The dolomite is loaded into a hopper on top of the charging machines and the conveyor belts transfer the dolomite to the furnace's interior by centrifugal force. The belts measure 9 in. wide and about 117 in. long.

Movable Ramp

A RAMP that may be moved up and down by means of an electric-hydraulic piston has been announced by the Joyce-Cridland Co., Dayton. The ramp is hinged at the outer end to a roller which permits the ramp to move forward or backward slightly as its other end is raised or lowered. Beneath the ramp is a hydraulic piston powered by an electric



oil-pumping unit installed near the entrance to the building. This ramp may be raised or lowered to any height desired within the 66-in. range of operation.

Stock Checker's Truck

7 HAT is stated to be a new departure in a stock checker's truck has been announced by Palmer-Shile Co., 784 S. Harrington Ave., Detroit 17. This item not only combines liberal capacity with marked compactness and flexibility, but also self-contains a conveniently placed writing table and stationery rack. The construction is all steel welded, with three sheet steel shelves which have a one in. flange all around. The tubular handle is so positioned as to form a protective bumper for the stationery rack. It is fitted with four rubber tired, ball bearing casters; two swivel, while the other two are rigid. Overall height to top shelf is 421/2 in., and to top of writing table, 50 in.



ANNOUNCING A NEW MODEL

HIGH SPEED PRECISION LATHE

FEATURING:

Hardened and Ground Steel Dovetail Bed Ways. Three Point Bed Mounting. Center Drive Headstock.

Patented Positive Lock Slide Rest.

Index Slide Has Hardened and Ground Steel Top. Full Bearing Tailstock Spindle.

For complete information, write for Bulletin DV59

HARDINGE

DOVETAIL BED

1" Collet Capacity - 9" Swing

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HARDINGE BROTHERS, INC., ELMIRA, N. Y.

PERFORMANCE HAS ESTABLISHED LEADERSHIP FOR HARDINGE

• Top administration turnover at Ford and Chevrolet enliven the news from Detroit . . . More Ford changes are in prospect . . . Pontiac announces 1946 models.



ETROIT—The big news of the week was certainly the way Henry Ford II proved he was really running the Ford Motor Co., six days from the time he was installed in his new job as president. He sat down in an 11 o'clock session with top officials last Thursday, and when the meeting finished a few minutes before 6 p. m., Harry Bennett had given up his long-time post as personnel director, Ray R. Rausch had been relieved of his responsibilities in production and non-production manufacturing, and other changes were taking place (not "in prospect") all through the organization.

This latest reshuffling of top executives at the Rouge is probably the culmination of a series of changes through the wartime years. The old guard of top advisers to Henry Ford has pretty well gone from the Dearborn scene—first A. M. Wibel, then C. E. Sorensen, now Bennett and Rausch. The latter two continue as directors of the company, with Rausch assigned to major construction projects, but the general interpretation in Detroit was that their influence has passed its zenith, and a new dynasty of administrators has taken over.

Flanking the 28-yr-old president of Ford is M. L. Bricker, who has been placed in charge of all manufacturing, J. R. Davis, handling sales and advertising, John S. Bugas, in charge of industrial relations, and R. H. Mc-

Carroll, in charge of engineering. The other administrators at the top today include C. H. Carroll, on purchasing; R. I. Roberge on foreign operations; and B. J. Craig and H. L. Mockle, handling accounting, auditing and finance.

Down through the departments in the Rouge and out in the branches a number of other important changes were developing. Harry Bennett's influence as a director obviously was not as significant as when he was personnel chief. Harry Mack, Bennett's close associate, recently shifted to the managership of the southwest region at Dallas, resigned, and transfer was in prospect for Mack's successor at Dearborn branch, Harold Turner, J. Russell Gnau, office manager at Dearborn, resigned. So did J. H. Siminick, superintendent at the Highland Park plant. Stanley Fay, assistant personnel director under Bennett, also quit, and an indefinite leave of absence was reported for Clifford Prevost, Washington representative of the company, in charge of personnel, etc.

This slight deterioration of employee relations is not untypical of the entire Detroit scene today. Although the bold threat made a few weeks ago by the auto union in the direction of all producers has tended to diminish with the passage of time. a state of mind has been born. The dynamics of the auto union-the unsettlement which almost necessitated some kind of a warlike declaration from the top officials-are likely to compel action of one sort or another during the coming few months. Simultaneously the prospect of a convention in the future, either next April as presently scheduled or sooner if many local presidents have their way, means the resumption of factional bickering among the lower tiers of authority and the customary attendant intermittent work stoppages. It is hardly a cheerful picture, but then, from management's standpoint it has never been entirely cheerful for the past eight years.

THE Ford personnel upheaval wasn't the only one of consequence last week in Detroit. The same



TAKES OVER: Henry Ford II newly elected president of the Ford Motor Co, previously vice-president of the firm since April 1944.

evening the Bennett-Rausch changes were taking place, William E. Holler, general sales manager of Chevrolet, was announcing his own resignation at a testimonial dinner honoring his retiring assistant, E. A. Nimnicht-Holler, who brought Chevrolet during the past 12 years to the top sales position in the industry, will leave Oct. 15 and will go to live on his Florida estate.

His successor will be T. H. Keating, who, with Nimnicht, was an assistant general sales manager. Keating has been with Chevrolet since 1917, first as a record clerk, later as factory representative, city and zone sales manager, then regional sales manager.

The Holler resignation would have been a considerable surprise six months ago in the industry; since then it has been more or less expected. Up till early this year however, it was believed that he would be the next vice-president for sales of General Motors Corp., in recognition of his brilliant record at Chevrolet, a post finally given to W. G. Lewellen, previously one of Holler's assistants.

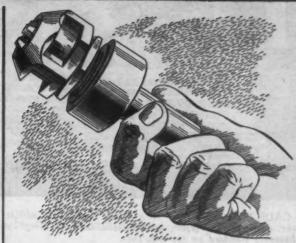
Not to be outdone, Chrysler Corp.

"GREENFIELD MAN"

SHOW-HOW

A "Greenfield Man" on a routine service call at a large plant in New York State was told by the Tool Supervisor that they had to finish threading a certain part by hand because the threading operation on the turret lathe was producing tapered threads. "It is a major headache," said he.





2 "That looks like a 'natural' for one of our 'Acorn' Dies," said the "Greenfield Man". He located an "Acorn" Die Releasing Type Holder in another department which he adapted to fit turret of machine by having shank ground down from %" to %".

3 While shank of holder was being adapted to fit turret, the "Greenfield Man" phoned local "Greenfield" Distributor and asked him to send over two "Acorn" Dies from the distributor's stock right away.





4 Before the "Greenfield Man" left the plant, this emergency "Acorn" Die set up was running smoothly producing perfect threads, and an order was placed for the correct size holder

A needless operation was eliminated. Production time was cut to a fraction and a serious bottle-neck eliminated. Value of on the spot show-how service by "Greenfield Man" and quick delivery from stocking "Greenfield" Distributor was demonstrated.

Greenfield's SHOW-HOW is KNOW-HOW in actions

Greenfield's SHOW-HOW IS KNOW-HOW GREENFIELD
ON THREADING PROBLEMS SIMPLY CALL YOUR "GREENFIELD"
MAN" THROUGH YOUR "GREENFIELD" DISTRIBUTOR!





1946 CADILLAC: This front view of the 62 model Cadillac for 1946 shows the new massive grille, fender-embedded fog lamps and wrap-around bumpers standard on the new cars.

had a significant change of its own. John Scoville, statistician and economist for the company since it was founded in 1925, announced his resignation to enter private practice as a consultant. Scoville was an outstanding disciple of free enterprise in a company which specializes in rugged individualists.

TURNING to other matters, Pontiac has announced its 1946 models, second of the General Motors divisions to do so. Production goals call for the output of a half million cars in the first year of full production. Like other G.M. divisions, Pontiac had high hopes of turning out 5 pct or so of its 12-month projection during the balance of this year, but, in common with the others, the fear of labor troubles ahead has made its anticipations uncertain.

The new Pontiac is available in 6

and 8 cylinder models with engines interchangeable, as has been customary since 1940. The wheelbase for either model is 122 in. The six develops 90 maximum brake hp, and the eight, 103.

A number of mechanical changes are included in the new car. There is notable emphasis on greater corrosion resistance, typical of all General Motors cars for 1946. Sills, doors and floor undersides are sprayed with a rust and corrosion protective. Additional clip retainers secure door bottom weather strips. Standard prewar zinc diecastings are specified. Chrome plated moldings have a stainless steel or brass base. Door sill plates are aluminum and chrome plated wherever used on bodies and have been substantially thickened.

Bearing surfaces of piston pins are peened just prior to final grinding and lapping, not only making the metal

more fatigue-resistant, but also giving the bearing surface innumerable tiny oil pockets. The shells on the muffler have been thickened, and silencing chambers rearranged. The tailpipe is coated with aluminum inside and out for appearance and longer wear. Tire rims are wider by a ½ in., the 5-in. width providing better mounting for tires and longer wear. Rear spring brackets have been doubled in thickness to guard against wear and looseness of spring bolts. Interior hardware is polished chrome, rather than the plastic of prewar.

Graham-Paige Wants Heavy Welding Plant

Warren, Ohio

• • • Graham-Paige Motors Corp., operators of the Navy-owned Warren City Mfg. Co. plant, one of the largest heavy machining and welding plants in the country, has no intention of relinquishing it.

Listed earlier this week by the Navy as surplus war materiel, the plant was valued at \$7,146,000 and was one of the 126 plants and ship-yards listed in the nation by the Navy as surplus property.

According to reports, Graham-Paige officials have long since made it clear to the Navy department that they wanted to operate the plant in peacetime after their war work had been completed. The plant is equipped to do heavy welding and machining jobs but is not, however, adapted to the manufacture of automobiles.

Fisher Lets Contracts

Detroit

• • • Fisher Body Div. has let initial contracts for its new stamping plant at Hamilton, Ohio. Plant completion is scheduled by next May.

Contracts already awarded include the Layne Ohio Co., Columbus, Ohio, well drilling; the Dravo Corp., Pittsburgh, complete power house; American Bridge Co., Pittsburgh, Pa., for structural steel; the Detroit Steel Products Co., Detroit, metal roof deck; the Harnischfeger Corp., Milwaukee, Wis., electric traveling crane.

Other contracts for excavations, grading, sub- and super-structures, office building and garage and a power substation will be let soon.

The new Hamilton plant will have nearly 1,000,000 sq ft of floor space.

NEW 1946 STUDEBAKER: The 1946 Studebaker Champion, newly announced by the South Bend automaker, is available in this coupe and three other body types. Designing follows the lines of the more expensive Studebaker series available in the prewar period.





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attractive sets for tool room, die shop, pattern shop and general production use. This set consists of 12 tools of assorted shapes furnished in an extremely practical and attractive plastic case which provides a convenient method of keeping the tools in perfect condition.

Designed and manufactured to provide another time saving tool for industry, they have proved themselves an invaluable replacement for hand files and mounted grinding wheels in innumerable operations requiring these tools. The extreme hardness of tungsten carbide permits these tools to be used on practically any material, including hardened steel up to 65 Rockwell C. They will cut many times faster than grinding wheels, being run at speeds from 65,000 to 100,000 RPM. Sharp corners, forms and radii can always be maintained. On softer materials the same advantages are apparent, and in addition their life is at least 50 times that of steel files.

The twelve tools in this set are solid tungsten carbide, 1% inches overall with %" diameter shanks. A new descriptive bulletin, containing full specifications, will be sent you immediately upon request.





1729 FERRIS AVENUE . LINCOLN PARK 25, MICHIGAN

Washington . . . L. W. MOFFETT

• Dept. of Justice and Federal Trade Commission refuse to comment on stainless steel basing point change... Noncommittal on reports involving other base point changes.



ASHINGTON - Neither the Dept. of Justice nor the Federal Trade Commission will comment on the action of the stainless steel manufacturers in shifting from a single to a multiple basing point system and reports that the industry as a whole is preparing to expand its multiple system. Tight lipped as they are, however, it is a certainty that both Justice and FTC are closely watching these developments with deep interest. For the basing point has been a target for lively and intense shooting by both these government units for some 25 years. Justice is armed with the Sherman Anti-Trust Law. FTC's favorite weapon is the Clayton Act, which blasts unlawful price discriminations.

Both insist upon complete abolition of the basing point system. However, Justice, as outlined in its suit filed at Denver in July against the Cement Institute, is agreeable to continuance of the delivered price basis of quoting at the discretion of the buyer provided the mill charges only its base price, plus the cost of actual transportation to the purchaser. The FTC has consistently held out firmly for an f.o.b. mill price system.

It has not been made clear but there could be a wide difference between the two positions. The Justice requirement works itself back to an f.o.b. price basis but it apparently does not bar uniform delivered sales. While it prohibits prices over and above the base figure plus actual transportation costs, it does not limit quoting to the actual producing mill but would allow quoting on the basis of the mill nearest the point of delivery regardless of whether it is or is not a basing point. As now practiced under the multiple basing point system, quotations are established on the base mill nearest point of delivery.

The Justice suit against the Cement Institute, one of the last filed by Francis Biddle before retiring as Attorney General, plainly was fitted to the Supreme Court's April decision in the Corn Products Case. That decision knocked out the single basing point system as practiced by the Corn Products Refining Co.

It did not pass upon the legality of the multiple basing point system but it did point out that the House Committee on the Judiciary had withdrawn a provision (Wheeler-Utterbach Bill) which, in tune with the FTC demand, would have required that the price of all commodities sold in interstate commerce be computed on an f.o.b. factory basis in order to avoid the prohibited discriminations in selling price. The bill, the court pointed out, would have prohibited any system of uniform delivered prices, as well as any basing point system of delivered prices. Justice in its Cement Institute suit evidently had the Corn Products decision in mind in stating its willingness to permit continuance of quoting delivered prices provided they did not exceed the mill price plus transportation charges.

Speaking of the proposed amendment to the Robinson-Patman Act which would have required f.o.b. mill pricing, the Supreme Court referred to it as involving a drastic change in existing pricing systems, and added:

"We think this legislative history indicates only that Congress was unwilling to require f.o.b. factory pricing, and thus to make all uniform delivered price systems and all basing point systems illegal per se. On the contrary, we think that it left the legality of such systems to be determined accordingly as they might be within the reach of sec. 2a (of the Clayton Act), as enacted and its move restricted prohibitions of discriminations in delivered prices."

This language, in effect, would seem to leave the legal merits of any system to its own performance within the meaning of the Clayton Act price anti-discrimination clause. Support is given this point by the fact that the single basing point system itself. although condemned in the Corn Products Case, was not outlawed as a system of pricing but for an industry with widespread plants the court turned thumbs down on the system. This is not true of an industry with a small operating area as was seen in the Maple Flooring Case in which, as in the old Cement Manufacturers Case, the Dept. of Justice alleged violation of the Sherman law by a concerted price-fixing scheme by the adoption of a uniform basing point system. Maple flooring manufacturers operated under a single basing point system. Both cases were dismissed. The court found no prohibited concert of action.

While these cases did not involve alleged violation of the Clayton Act, the court made the point that in the Maple Flooring Case, the single basing point was so close to most of the points of production as to result in but trivial freight variances, and the defendants were willing to sell on an f.o.b. mill basis at the discretion of the buyer.

The point that freight variances were only trivial would indicate that the single basing point system—or for that matter, the multiple or any other quoting system—is not a violation of the Clayton Act if there are only slight differences in actual freight costs from the nearest producing mill.

The move to expand the number of iron and steel basing points as well as to add to the number of products at existing basing points is viewed here, of course, as an effort to forestall government action which, in the light of implications in the Corn Products decision, it might well do, even though FTC roundly condemns any basing point system and sticks fast to its demand for an f.o.b. pricing system.

Only FTC or Justice can say what each contemplates, if anything, should the expanded system be effectuated in the iron and steel industry, and neither will talk in the absence of official action. But at least the setting up of more basing points and adding to the list of products at those now established meets a contention made by Justice at the TNEC hearings in 1938.

After noting the trend in the industry was toward an increase in the



More parts produced with accuracy and fine finish

Here's a case-history that proves the importance of the right cutting oil! A plant had to produce vital parts quickly. With the aid of Sunicut 209, the transparent sulphurized cutting oil, they were able to turn out their quota of parts rapidly, with extremely close tolerances and fine finish.

Type of Machine: New Britain-Gridley Automatic Screw-Machine, 2" Capacity, No. 61, Six Spindles. Metal: . . . S.A.E. 4140 Bar-Stock.

Operation: Forming, drilling, tapping, and threading.

Speed: ... 85 SFPM

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Lubricant: Sunicut 209

Some manufacturers of this part were unable to perform the difficult tapping-operation all on one machine. A secondary operation was necessary, which resulted in the loss of production-time. Use of Sunicut 209 permitted all operations on one machine. Production was speeded up and fine-quality threads produced. Rejects were practically eliminated. Sunicut 209 is a free-flowing, transparent, correctly balanced sulphur, lard, and min-

eral oil combination. It is the right combination to BETTER machine-tool output. For actual proof of what Sunicut can do for you, test it in your own shop under your own operating-conditions!

SUN OIL COMPANY · Philadelphia 3, Pa. Spansors of the Sunaco News-Voice of the Air - Lowell Thomas



number of basing points, Justice said:

"In view of the multiplicity of products in the industry and the fact that a given basing point may be a base for only one product (and even for only one grade of a product) while another is a base for twenty or thirty, there is little significance in the total number of basing points at any given time. In other words, one is concerned in the steel industry not with one basing point system but with a series of systems, the adequacy and the significance of any one of which must be analyzed with relation to the characteristics of production and of the market for that product."

Since details of the reported plan for expansion of the multiple basing point system have not been announced. views as to its precise character vary but apparently the most common one is that the move is in the direction of a zone system providing a uniform price at any point of delivery within a specified area, Such a system was recommended in 1934 by an NRA committee but it met with a hot dissent in an FTC report. Yet there are legal sources which maintain that the zone system, covering important production of all products at each basing point, would stand up under a Supreme Court decision if the issue went to that tribunal.

It is assumed also that present bas-

ing points at non-producing locations, such as certain Gulf and Pacific ports, would be continued. These basing points were established to meet prices of imported steel. One reason for assuming that these basing points will be maintained is that they will be necessary when such imports are re-

sumed. It is also true that OPA regulations cover ceiling prices for products taking port basing points and if these were abandoned it was stated by one source that it would be required that delivered prices, wherever established, could not be increased over the prevailing ceilings.

Less Than 1 Pct Rise In Wages Is Estimated With a 65c Minimum

Washington

• • • Adoption of the 65¢ minimum wage in the metal working industries will set a floor under existing wages for unskilled labor but will not require wage raises for any significant number of workers, A. F. Hinrichs, Acting Commissioner of Labor Statistics told the Senate Committee on Education and Labor on Sept. 25.

Testifying on amendments to the Fair Labor Standards Act of 1938 (the Wage and Hour Law), Mr. Hinrichs estimated that average wage rate increases resulting from establishment of the 65¢ minimum would be less than 1 pct in the iron and steel, nonferrous metals, machinery and transportation industries. Actually, "iron and steel" as comprehended by Mr. Hinrichs included remanufactures and was not confined to the

steel producing industry which, according to the Department of Labor itself, showed an average hourly wage of 121.1¢ in July.

These estimates, it was pointed out, are based on straight time wages and do not include overtime pay or shift differentials. The scope of the survey included not only steel works, rolling mills and foundries but also miscellaneous steel consuming establishments. The estimated average earnings, it was pointed out, are somewhat deflated by inclusion of unskilled women workers employed in steel using plants.

Wage earners now paid less than 50¢ hourly wages number less than 5000 in each of these industries, Mr. Hinrichs said. Around 110,000 workers, or 7 pct, in the iron and steel industry as classified by him are paid less than 65¢ hourly wages and around 255,000, or 16 pct, are paid less than 75¢, he pointed out.

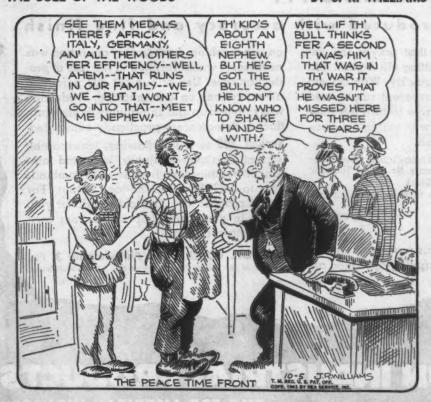
In nonferrous metals, Mr. Hinrichs said, 30,000 workers, or 8 pct, are paid less than the proposed 65¢ minimum with around 70,000, or 17 pct, earning less than 75¢ hourly wages.

The proposed legislation provides: An increase in the statutory minimum wage from the present minimum of 40¢ an hour to a minimum of 65¢, with an automatic increase to 70¢ one year after enactment and to 75¢ after two years. Establishment of higher than statutory minimum wages through a system of industry advisory committees and administrative orders. An absolute prohibition against employment of child labor by employers engaged in "commerce or in the production of goods for commerce."

It also provides a five-year statute of limitations for employee suits under Sect. 16 (b) of the Wage Hour Law. This provision is in line with union recommendations which opposed the one-year limitation provision of the Gwynne Bill (H.R. 2788). If the Gwynne Bill were to be enacted in its present form, it would not affect employee suits filed under the Wage Hour Law because the bill exempts specifically actions based upon Federal statutes specifying a particular statute of limitations.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



NOW IT CAN BE TOLD

Accuracy in "Millionths" on Production Job Obtained on Bryant No. 112 Internal Grinders

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B-29 FUEL INJECTION PUMP PRODUCED BY ECLIPSE

the Army Air Forces Air Tech- gineers. nical Service Command and Eclipse Machine Division of Production Tolerances Bendix Aviation Corporation. Unbelievable

Mass production of fuel in-

SPRINGFIELD, VER- nical details for production of MONT - Another stride by this part were worked out American war production gen- through the close cooperation ius was disclosed recently by of Eclipse and Bryant en-

In the hands of Eclipse jection pumps for the B-29 workers, the Bryant machines Superfortress has been are producing parts to diameter achieved at the Eclipse plants | tolerances of 10 millionths of an in Elmira, New York. The inch or less. This necessitates Bryant No. 112 Internal maintenance of straightness Grinder was chosen for the and roundness to even finer tolsleeve bushing job, and tech- erances. This infinitesimal de-

gree of precision was graphically demonstrated by Mr. T. W. Tinkham, General Manager of the Eclipse Machine Division. After demonstrating the precise fit between the plunger and the bushing ground on the Bryant machine, Mr. Tinkham had a newsman rub his fingers on the pump piston. The very slight film left by the newsman's fingers was sufficient to make the plunger stick in the bushing.

Improves Bomber Performance

B-29's equipped with the fuel injection pump are flying surer than ever before at extreme altitudes where rarefied atmosphere, varying pressures and sub - zero temperatures must be taken into account. It is interesting to note that the gasoline is the only lubricant used in the pump assembly.

Cooperation Plus Secrecy

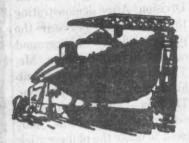
This is a typical example of the way Bryant men have cooperated with the engineers of our leading manufacturers during the war years. This is one example, but hundreds of others still must remain on the secret list. Now, when you are planning for a peacetime production there still is a Bryant man ready to assist you.



(Photo Courtesy Eclipse Machine Division)

MACHINES THAT DO THE JOB. This is part of the group of over a hundred Bryant internal grinders at Eclipse Machine Division, Bendix Aviation Corporation, Elmira, New York. These machines are grinding sleeve bushings to a tolerance of 10 millionths or less.

 Consolidated Steel Corp. absorbs Western Pipe & Steel Co. and becomes largest steel fabricator . . Big gas and oil pipelines to be fabricated by pressure welding.



Western Pipe & Steel Co. last week by Consolidated Steel Corp., Ltd., makes the combined operation of these companies the largest steel fabricating unit of its kind in the world.

Consolidated, headed by young, aggressive Alden G. Roach, owns or operates nine properties, seven in Southern California and two on the Texas Gulf. The four owned properties are the steel fabricating plant at Maywood; a ship repair yard at Terminal Island; a small boat yard at Newport Beach; and California's intriguing Texas invasion, Consolidated Steel Corp., of Orange, Tex., another strategically located fabricating plant. Consolidated also operates a Wilmington shipyard with a 14,000 ton drydock for the Maritime Commission; a Texas navy yard where destroyers and DE's were built; a ship repair yard owned by the Maritime Commission at Long Beach; another repair yard with docks leased from the San Pedro Lumber Co. and the Craig Ship Construction Yard also at Long Beach.

The firm has also been an energetic member of the California steel fabricating industry. It built the tunnel forms for the Los Angeles metropolitan aqueduct, the dome of the Mt. Palomar Observatory, part of the

Moffett Field wind tunnel, Shell Oil's synthetic rubber plant and numerous other jobs. It is the outgrowth of a former consolidation of the Llewellyn Iron Works founded in 1886; the Baker Iron Works, 1872; and the Union Iron Works in Los Angeles, founded in 1884.

PECULIARLY enough, Consolidated, with a \$5,765,000 capital structure, is the buyer of the older—and in peacetime larger—Western Pipe & Steel Co. for \$6,217,373. This figure works out to around \$40 a share on Western Pipe's capitalization, so little doubt exists about the necessary stockholders' ratification. The \$40 valuation represents a \$10 to \$12 advance over wartime quotations, and a considerably greater increase over prewar selling price.

In recent years not exactly famed for any rip-snorting fighting qualities, Western Pipe was still no slouch in the steel fabricating business. The firm's principal fabricating plant is located in south San Francisco with its adjacent shipyard. Other plants are located at Fresno, Los Angeles and Phoenix, from which it services local projects. In addition the company derives much of its oil field business from two or more plants located in the heart of the oil country at Bakersfield and Taft. A second shipyard, built and operated for the Navy, is located at San Pedro. The

wholly owned Steel Tank & Pipe Co. at Berkeley and Western Pipe's interest in the Western Tank Car Co. are also included in the transfer of assets to Consolidated.

The history of Western Pipe reaches back to pioneer hydraulic mining days in California through acquisition of the Francis Smith Co. of Grass Valley which manufactured riveted pipe as far as back as 1854.

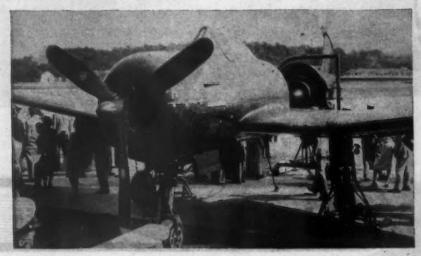
Western Pipe is also one of the pioneers in welding, having built an all-welded pipe line for the city of Vallejo in 1925, and subsequently worked in the development of the automatic welding process.

Offer to purchase included the assurance that Western Pipe & Steel would continue to operate under its own name as a wholly owned subsidiary.

While Consolidated's reputation in the shipbuilding business is newer than that of Western, it is expected that the activity of the joint operation will, if anything, increase in this field. Among the names included in the recent syndicate bids for the American President Lines was that of Alden Roach and the Consolidated Steel Corp.

Along with West Coast interest in the South American and oriental markets, growing rumors that California drafting boards are littered

NAVY'S FIREBALL: The new FR-1, the world's first war plane using both jet and conventional engines with a propeller, is the first to be accepted for aircraft carrier use with a tricycle landing gear. The tail section has been separated to show the jet engine.



Worried About 18 7 Tomorrows ?? Tomorroduction?



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Leadership in developing advanced manufacturing methods . . . long years of engineering experience . . . modern and complete facilities . . . that have given Ex-Cell-O an outstanding record in production for war-all these can help you solve the problem of mass production of accurate parts and sub-assemblies for your new or redesigned products. Ex-Cell-O, with machining, heat-treating, grinding and assembling and inspection facilities all under one management, offers you many practical advantages. Send your print or part or sketch to Ex-Cell-O in Detroit today, or get in touch with any member of Ex-Cell-O's field engineering staff in 32 of the leading industrial centers in the United States and Canada.



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Various Types of Air-Draw Batch Type Furnaces Gas Carburize Furnaces

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Continuous Air-Draw Furnaces

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UNIT ASSEMBLIES

For many years Ex-Cell-O has supplied large and small manufacturers with port and has also supplied many perts in unicessemblies after machining, heal freating and arinding.

INSPECTION

Ex-Cell-O has always measurement that quality in a product is not the result of accident; that quality is built into a product by rigid adherence to accepted quality standards . . . standards that are upheld at Ex-Cell-O by efficient inspection at every step of the machining process.

45-96

EX-CELL-O CORPORATION

DETROIT 6, MICHIGAN

with plans for rebuilding Philippine industry and cities from the ground up, considerable significance is lent to the company's reference to this market—especially when considered in Mr. Roach's known interest in shipping and recent identification with the Moore-McCormack interests.

While plans and projects, both immediate and remote, still fill the western air, although few have reached the crystallization stage, steel men are finding some satisfaction in immediate pipeline jobs on which bids are being let.

El Paso Natural Gas Co. of Texas has filed an application with the FPC for construction of a natural gas line from Jal, N. Mex. to the Colorado River. The pipe is to be 26 in. by 5/16 in. and the line some 763 miles long. A. O. Smith is believed to have the contract due, partially it is understood, to having taken part payment in the pipeline bonds.

A little less definite, but understood to be set, is the other end of the line. Pacific Lighting Corp. is said to be ready to take up at the Colorado River where the Jal line leaves off, in a project which will reverse the Texas-California rivalry by piping some 300 million ft. of Texas gas into the middle of California's natural gas area. Local oil and natural gas interests are believed to be somewhat opposed to such an incursion.

Standard Oil of California has another pipeline job on which bids are being received this week. Again it is understood that A. O. Smith has anded the steel contract.

Although specifications did not call for such high grade steel, 60 miles will be built of 52,000 yield pipe and over 100 miles of 45,000. The requirement is understood to have been 35,000 lb min which would have brought the specifications down somewhere in the neighborhood of the resistance of the West Coast's mass of surplus Navy plate, which might have been a start toward disposal of the white elephant. However, it cannot be determined whether A. O. Smith looked at this material or not.

THE El Paso Natural Gas and the Standard Oil jobs are being watched with a good deal of interest. The often recurring question during the war as to what was going to become of the seeming millions of newly created welders may find its answer on these two projects. And the answer may be "nothing."

It is reliably reported that the two jobs will be built by the pressure welding method patented by the El Paso Natural Gas Co. and being exploited by Linde Air Products and its parent the Union Carbide & Carbon Co. To review briefly, the welding method consists of heating the two ends of the pipe by means of a portable piece of equipment to forging or plastic temperature with a ring of oxyacetylene gas jets and forcing the two ends together. The bond is sufficiently strong to have been used on the recent helium line job in Texas which has to withstand a 2500 lb pressure, which is said to be by no means the upper limit.

In view of the recent West Coast boilermakers' demands for higher field wages, possibilities of the method being pushed by the Pressure Weld Co. is peculiarly interesting. On a 24 in. line welding time takes 11/2 mins with 41/2 mins between joints and two mechanics to operate the equipment. Ordinary welding methods require about halfan-hour for the same operation performed by two welders—on that basis alone, an increase in efficiency of 500 pct. Backers of the method, which it is understood has been used on several major jobs in the East, claim several other benefits, but solely on this record western oil, gas and water line men are planning to keep close tab on the first western trial.

As eastern firms snatch the steel for these major lines from local sources, western mills are beginning to figure on the California Water & Telephone Co.'s imminent 30 in. line in Monterey County. At this size it is expected that local mills may stand a better chance of landing this 7500 ft. job. Calls for bids are expected any day.

Another sizable construction job will also be let this week. The OIC of construction at Roosevelt Base, Terminal Island, is calling for bids on 17,000 tons of structural steel for a new bridge to replace the present inadequate structure from the mainland. Apparently imperative, the contract will call for completion within 520 days with a \$500 a day penalty clause.

Special Sales Are Now Generally Unrestricted

Washington

• • • With civilian buying now generally unrated, WPB has announced that with a few exceptions preference ratings no longer will apply to special sales under Priorities Reg: 12. Among items on List A still restricted in domestic special sales are antimony, pig tin and uranium, obtained under Conservation Order M-328-B, orders in the M-388 series, and natural rubber. These now require a specific authorization from WPB, except the materials obtained under Conservation Order M-328-B and orders in the M-388 series, which the holder may sell only on orders rated with the new "CC" rating or higher.

The few remaining items on List B restricted on export special sales include antimony, babbitt, solder, tin and uranium.

ANOTHER BRITISH SECRET: A portable seadrome consisting of a number of buoyance cans with hexagonal surfaces so linked together to give to the motion of the sea in any direction and able to remain rigid enough to support the weight of heavy aircraft, was invented by the British at the start of the war.







Buckeye Stamping Saves 66% on Floor Space . . . 33% on Initial Investment

MULTIPRESS blanks and draws seamless metal cans and boxes at the rate of one every second, in The Buckeye Stamping Company plant at Columbus, Ohio — a blanked and formed container with each complete ram stroke! And along with this high-speed production, Multipress saves two-thirds of the floor space previously used . . . features a relief valve that prevents damage to dies in case work jams . . . requires less experience for skillful operation . . . reduces fatigue and increases safety for the operators. And cost of the complete MULTIPRESS installation was one-third less than equipment formerly required!

These MULTIPRESS savings are typical. Its performance in scores of plants on dozens of operations proves that MULTIPRESS is Industry's New Tool of amazing advantages.

MULTIPRESS is an extremely compact, bench-size, oil-hydraulic machine tool, built in four, six and eight-ton capacities. Ram pressures are regulative from 300 pounds to capacity...ram strokes from ½-inch to capacity.

Get full details on MULTIPRESS and its remarkable accessories—including indexing tables . . . straightening fixtures . . . automatic cycling controls . . . and the revolutionary VIBRATORY RAM ACTION all Industry is talking about! Write today!

The DENISON Engineering Company, 1158 Dublin Road, Columbus 16, Ohio



TENESON TO THE STATE OF THE STA



THOMAS J. HILLIARD, vice-president în charge of sales, Carnegie-Illinois Steel Corp.

- Thomas J. Hilliard has been elected vice-president in charge of sales of Carnegie-Illinois Steel Corp. Mr. Hilliard has been general manager of sales since 1938. He will be succeeded by J. Douglas Darby, who has been manager of sales for the company in Philadelphia since 1939. A. Paul Selby has been made assistant general manager of sales and Wesley C. Bobbitt manager of sales in Philadelphia.
- J. H. Edmonds has retired as general manager of the Lebanon, Pa., plant, Bethlehem Steel Co. Walter R. Penman, formerly assistant general manager, succeeds Mr. Edmonds. Mr. Penman entered the employ of the company at Lebanon in 1919 and has been assistant general manager since 1940. Robert L. Riley, assistant factory superintendent and superintendent of the Bethlehem-Lebanon Forge Co. during the war, succeeds Mr. Penman.
- Frank E. Walling, acting manager of the Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh, has been promoted to president and general manager of the division.
- George L. Bladholm will be associated with iron and steel scrap brokerage activities of Construction Sales Co., Inc., at its Chicago office.
- R. M. Simpson has been appointed sales representative for the Chicago territory of Pittsburgh Plate Glass Co., Columbia Chemical Div., Pittsburgh.
- Porter R. Wray has been appointed alloy metallurgical engineer of Carnegie-Illinois Steel Corp., Pittsburgh.

PERSONALS

• W. H. Spooner has been appointed New York district sales manager for the Central Iron & Steel Co., Harrisburg, Pa.; Fred L. Steuber, for the Philadelphia district; E. S. Webster, Southern district; W. A. Hill, New England district and Kenneth M. Rhoads, Harrisburg district.

- Ernest Koyle has been appointed Detroit district metallurgist for the Steel & Tube Div. of the Timken Roller Bearing Co., Canton, Ohio. Mr. Koyle has for the past 14 years been in the metallurgical dept. of the Timken Steel & Tube Div., specializing in automotive alloy steels.
- John S. Hutchins has been elected president of Ramapo Ajax Div. of American Brake Shoe Co., succeeding J. Brookes Spencer, who remains as a vice-president of Brake Shoe Co.
- Henry Ford, II, has been named president of Ford Motor Co., succeeding his grandfather, who has resigned but who retains his place on the board and will act in an advisory capacity. The younger Ford was named executive vice-president of the company in April 1944.
- W. S. O'Connor has been promoted to national field sales manager of U. S. Gauge Co., New York. H. M. Bear will succeed Mr. O'Connor as district manager of sales territory covered by the New York office.
- H. J. Fitzpatrick, formerly works manager of plant 9 of the Crosley Corp., Cincinnati, has been appointed works manager of all Crosley plants in Cincinnati.
- John S. King, formerly manager of Fairbanks, Morse & Co.'s Pump Div., has been made new acting manager of the Railroad Div. He succeeds C. H. Wilson. Arnold G. Brown, formerly assistant manager of the Pump Div., succeeds Mr. King as manager.
- B. W. Crenshaw has been appointed sales representative with headquarters in St. Louis of the Scullin Steel
- Harley C. Lee has rejoined Basic Refractories, Inc., Cleveland, as vicepresident and technical director, after having been in charge of the technical dept. of the company's former subsidiary, Basic Magnesium, Inc.



DAVID F. AUSTIN, vice-president—sales, U. S. Steel Corp. of Delaware.

- David F. Austin has been named vice-president-sales for the U. S. Steel Corp. of Delaware, Pittsburgh. A short time ago he had been appointed acting vice-president for the Delaware company following the resignation of Avery C. Adams, but at the same time maintained his duties as vice-president in charge of sales for Carnegie-Illinois Steel Corp. Mr. Austin was with Carnegie Illinois Steel Corp., U. S. Steel subsidiary, for some time, having worked up to his present position from a district sales office.
- Clark W. King has been appointed executive assistant of the Allegheny Ludlum Steel Corp., Brackenridge, Pa. Mr. King comes to Allegheny Ludlum after more than four years' service with the Steel Div. of the WPB, Washington.
- S. U. Shorey has been appointed assistant manager, plasticizers and resins sales, and B. B. Langton, assistant manager, intermediates sales, of Monsanto Chemical Co.'s Organic Chemicals Div., St. Louis.
- Joseph Edie, formerly sales representative for Jessop Steel Co., Cleveland, has been named branch manager at Indianapolis.

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• H. A. Squibbs, formerly assistant general manager of sales, Chicago district, American Steel & Wire Co., U. S. Steel Corp. subsidiary, has been made assistant to the sales vice-president, and will be succeeded by C. T. Gilchrist. Mr. Squibbs has been associated with the Steel & Wire Co. and one of its predecessor companies since 1895, and Mr. Gilchrist has been with the company since 1907.



PRODUCTION BRAZING

Each of these parts represents a tough production bottleneck that was broken by fast, economical "Production Brazing"! Machining was found to be too slow and too costly. Even more important, Production Brazing produced stronger, cleaner parts.

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It is very possible that the metal products you now manufacture can be made better, cheaper and faster by Lindberg Furnace Production Brazing.

There's no cost or obligation involved in having a Lindberg engineer study your methods and products. His suggestions and recommendations can be most helpful in maintaining and strengthening your position under the keener post-war competition now at hand.

Write, wire or phone for immediate attention.



Lindberg Atmosphere Brazing Furnace

LINDBERG ENGINEERING COMPANY 2452 WEST HUBBARD STREET, CHICAGO 12, ILLINOIS

INDBERG Furnaces

SUPER-CYCLONE . CYCLONE . HYDRYZING . BRAZING

THE IRON AGE, October 4, 1945-103



JOHN GRAHAM, general manager of sales, America Steel & Wire Co.

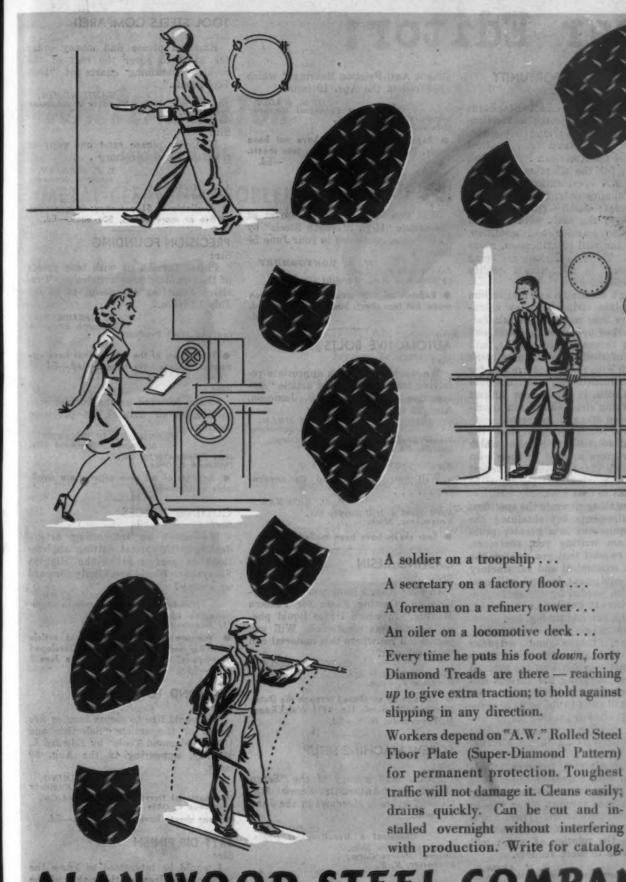
- John Graham has been appointed general manager of sales, American Steel & Wire Co., Cleveland, a subsidiary of U. S. Steel Corp. R. F. Curtis, formerly assistant manager of the Manufacturers Products Div., will become manager of that division, succeeding Mr. Graham, with Norman Sted, formerly in the Cleveland district sales office, as assistant manager. Mr. Graham joined the company in 1911, was named manager of the New York sales office in 1930, and in April 1937, was transferred to Cleveland as manager of the manufacturers products sales. In July 1942, he was named assistant to vice-president. Mr. Curtis joined the company in 1920 at Worcester, Mass., and became assistant manager of the Manufacturers Products Div. in April 1937. Mr. Sted, who has worked for the company since 1926, has been assistant to the manager of Cleveland district sales since December 1943.
- Raymond H. Gaver has been appointed chief engineer of the Railway Equipment Div. of the American Welding & Mfg. Co., Warren, Ohio. Jonas D. Bigelow has been named development engineer of the same division.
- Allan L. McKay, vice-president and general sales manager of the Kaukauna Machine Corp., Kaukauna, Wis., has been elected president of the firm to succeed Lt. Col. Ralph J. Kraut.
- Walter N. Fischer has been appointed to the newly created position of assistant to the general sales manager of R. G. LeTourneau, Inc., Peorla, Ill.

- John Lauritsen has been made general manager of J. B. Kendall Co., Washington, D. C. He was previously associated for 21 years with Republic Steel Corp.
- Gordon E. P. Wright and Paul A. Ketchum have been appointed assistant general managers of branches of the Pittsburgh Plate Glass Co., Pittsburgh.
- D. J. Sweeney has been appointed engineer in charge of mechanical development of the research and advance development dept. of the Engineering Div. of the Crosley Corp., Cincinnati.
- K. L. Clark has become associated with Detroit Gray Iron Foundry Co., Detroit, in charge of the cast to shape, air hardening tool steel sales. For the past 16 years Mr. Clark has been associated with Forging & Casting Div., Allegheny-Ludlum Steel Corp., at Ferndale, Mich., serving that company as both president and later as general manager.
- Albert E. Baak has been appointed executive director of the Controls Div. of Paul Henry Co., Los Angeles.
- Walter R. Breeler has succeeded Charles Spittall, retired, as general manager of the Allegheny Ludlum Steel Corp.'s Dunkirk, N. Y. plant. Mr. Breeler formerly was assistant general manager, and has been with the Dunkirk plant since 1926.
- Riley R. Clark has been appointed supervisor of wage and salary administration for the industrial relations dept. of the Chicago district, Carnegie-Illinois Steel Corp. He is succeeded at South works by J. J. Morrissey, formerly assistant to division superintendent of steel production in charge of personnel.
- Joseph W.'S. Davis has been appointed assistant district sales manager, New York district, American Locomotive Co.
- John J. B. Fulenwider and J. B. Johnson have been elected directors of the Hercules Powder Co., Wilmington, Del.
- Kenneth Sutherland has joined the staff of Bjorksten Laboratories, Chicago. He was previously associated with Turco Products, Inc.
- G. A. England has been appointed manager of foundry sales of American Car & Foundry Co., with headquarters in New York.

- Robert O. Brannan has been elected vice-president in charge of sales and purchases of the Cleveland Steel Barrel Co., Cleveland.
- Albert Baron has been appointed purchasing agent of the Whiting, Ind., plant of Federated Metals Div., American Smelting & Refining Co. Mr. Baron has been associated with Federated at New York and Detroit since 1928, and for the past year has been assistant purchasing agent at Whiting.
- E. J. Bredeson, assistant plant manager of the Chevrolet plant at Muncie, Ind., has been named plant manager. He succeeds H. A. Leary, who has retired from active business life. J. L. Coyle, superintendent of the Chevrolet-operated DPC plant at Anderson, Ind., has been named plant superintendent at Muncie.

OBITUARY...

- John D. McGrath, purchasing agent and director of the managing board of the Whitney Chain & Mfg. Co., died recently at Hartford.
- James S. Fulton, Pittsburgh special representative for Ingersoll-Rand Co., died recently.
- Eugene C. Batchelar died Sept. 15 in Allegheny General Hospital, Pittsburgh. He was a director of the Motch & Merryweather Machinery Co. and for 36 years was manager of the Pittsburgh district office of the company.
- W. Chichester Sayle, president of the Cleveland Punch & Shear Works Co., Cleveland, and of the Cleveland Crane & Engineering Co., Willoughby, died unexpectedly Sept. 15.
- J. C. Ogden, 78, chairman of the board of directors of Robert W. Hunt Co., Chicago, died in Plainfield, N. J., recently. He had been associated with the Hunt organization for the past 52 years.
- W. Harry Blocksidge, 67, chief metallurgist of J. H. Williams & Co., Buffalo, died Sept. 15.
- Charles McCullough, 75, associated with the Fuller-Warren Co., Milwaukee, and secretary at the time the firm was dissolved, died Sept. 15.
- C. A. Young, 56, manager of sales, Hot Rolled Products Div., Sheffield Steel Corp., Kansas City, died suddenly Sept. 15.



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SINCE 1826 :: CONSHOHOCKEN, PENNSYLVANIA :: District Offices and Representatives:

SINCE 1826 :: CONSHOHOCKEN, PENNSYLVANIA :: District Offices and Representative
Philadelphia New York Boston Atlanta Buffalo Chicago Cincinnati
Denver Detroit Houston St. Paul New Orleans Pittsburgh
Los Angeles San Francisco Seattle Montreal

Dear Editor:

DEVELOPMENT OPPORTUNITY

Sir:

The National Aircraft Standards Committee has requested and collaborated with the Working Committee of the Army-Navy Aeronautical Board and the American Iron & Steel Institute, for the adoption of provisions of AN specifications for steel, aircraft quality only, to provide that such aircraft quality steels shall be identified at the mills with the AN specification number and condition, and also the mill identification, name or mark. These provisions are being incorporated in all aircraft quality steel specifications.

Although aluminum and magnesium sheet, plate, strip, and a few extrusions, have been more or less satisfactorily marked by the mills (sheet and plate are thoroughly identified), mill marking of steel upon surfaces black and rough with scales and greased for protection immediately after it comes from the rolls, is much more difficult than marking clean and bright aluminum or even magnesium sheets.

The new requirements replace the individual color-banding codes which the contractors applied in their own plants, each plant having a different code and requiring that personnel be accustomed to that code.

It is one thing to write the specification requirements but obtaining the proper equipment is a greater problem. I am writing you, therefore, with the request that you publish the fact that economical and satisfactory marking equipment is, and will continue to be, needed by the mills producing aircraft quality steels-sheet, plate, strip, bar and tubing, and aluminum and magnesium sheet, plate, strip, bar, tubing and extruded shapes. It has been necessary for the contractor to scrub off the greased coat before applying the various color-band combinations and the same problem will exist in the mills because the steel is oiled or greased for protection and is often stored many days before it is verified to be aircraft quality.

Northrop Aircraft, however, in collaboration with Sylvester Supply Co. in Los Angeles, developed a marking ink which goes through oil or grease and is quite permanent. There are a number of problems in connection with this, the solution of which will be profitable to alert vendors.

Chairman, Western Div., NASC Northrop Aircraft, Inc., Hawthorne, Calif.

ANTI-FRICTION BEARINGS

We would appreciate receiving four reprints of the article "Corrosion Resistant Anti-Friction Bearings" which appeared in the Apr. 19 issue.

G. M. HALL,
Assistant Technical Manager
Milwaukee 1

• Reprints of this article have not been made, but we are sending you tear sheets.

HIGH STRENGTH STEELS

Will you kindly send a reprint of the article "High Strength Steels" by F. D. Foote, contained in your June 14

W. A. MONTGOMERY John Inglis Co., Ltd., 14 Strachan Ave., Toronto

Reprints of this article have not been made, but tear sheets have been forwarded.

AUTOMOTIVE BOLTS

We would very much appreciate receiving tear sheets of the article "Automotive Bolts" by A. S. Jameson, Aug. 23 issue.

OLIVE HELD, Technical Secretary

Stover Lock Nut & Machinery Corp., Easton, Pa.

Will you please send us several copies. . . .

P. D. RICKMAN Bard Steel & Mill Supply Co., Kalamazoo, Mich.

• Tear sheets have been mailed.—Ed.

CASTING RESIN

In your Aug. 9 issue you ran an article on "Casting Resin for Pattern Making," in which Durez liquid phenolic resin was mentioned. Will you please tell me where this material can be purchased?

C. W. CHARLOW * Hartford Electric Steel Corp., Hartford 6, Conn.

This can be purchased through the Durez Plastics & Chemicals, Inc., 1911 Walck Road, N. Tonawanda, N. Y.—Ed.

SCREW MACHINE SETUP

Please send a copy of the "Setup Charts for Automatic Screw Ma-chines," by J. J. Meadows in the June 14 issue.

R. C. DOANE, Chemical & Metallurgical Depts. Delco Appliance Div., General Motors Corp., Rochester, N. Y.

Would it be possible to receive the complete series .

C. H. WUMMEL, Engineering Dept.

Union Special Machine Co., Chicago 10

• Reprints have been made which are available at 60¢ each.—Ed.

TOOL STEELS COMPARED

Enclosed please find money order for \$1.00 to cover the cost of the booklet containing charts of "1500 Tool Steels."

NANU BDMIN, Manager & Engineer

Jyoti Ltd., Raroda, India

Will you please send one copy of the Tool Steel Directory . . .

T. F. O'BRIEN, General Manager

A. F. Holden Co., New Haven 8, Conn.

Available at \$1 per copy; in quantities of five or more copies, 50¢ each.—Ed.

PRECISION FOUNDING

Please furnish us with tear sheets of the combined nine articles on "Precision Founding" as described in the July 12 issue.

W. E. McKIBBEN, Research Engineer Chicago 2

Tear sheets of the articles that have appeared to date have been mailed.—Ed.

Please forward us the booklet containing seven articles on precision casting.

CORNELIUS W. MEYERS, Manager, Equipment Div.

Iron Fireman Mfg. Co., Portland 7, Oreg.

Reprints of all nine articles are available at 60¢.-Ed.

CUTTING DEVICES

Sir:

We noted an interesting article dealing with special cutting applica-tions as performed in the Higgins Shipyards. Would you kindly forward us a copy?

Development & Engineering Dept. Canadian Liquid Air Co. Ltd., 111 Beaver Hall Hill, Montreal

• We are sending copy of the article "Cutting and Welding Devices Developed by Higgins" which appeared in the June 7 issue.—Ed.

DIAMOND TOOLS

We would like to secure four or five copies of the article "Selection and Use of Diamond Tools" by Edward L. Murray, appearing in the Aug. 30

C. R. SCHEURING, Chief Tool Engineer

International Derrick & Equipment Co., Columbus 8, Ohio

Tear sheets have been mailed.—Ed.

BRYT DIP FINISH

Sir:

I would be interested to know the name and address of the maker of the Bryt Dip compound mentioned in the article "Metals, Finishes, and Finishing Processes" in the Sept. 6 issue.

I. GOLDMAN

L. & R. Metal Products, 895 Broadway, New York

. J. J. Siefen Co., Detroit, manufactures this product.-Ed.

HOW WHEELABRATOR

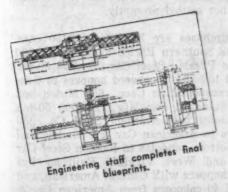
SOLVED THIS
METAL-CLEANING PROBLEM



Cleaning tests conducted in the factory laboratory at American to determine the most efficient method of handling.



Years of blast cleaning experience are combined to answer this design problem.





MERICAN engineering skill was called upon by the Taylor-Wharton Iron and Steel Company to solve this production cleaning problem. After a thorough survey of plant operations, product specifications and production requirements, sample cylinders were sent to our laboratory for test cleaning. On the basis of exhaustive tests and a series of engineering consultations through the four steps pictured here, a special cabinet was designed and built that cut cleaning time to 1/6 the former cleaning time required by out-moded methods and also resulted in a 300% increase in production.



View of Wheelabrator Special Cabinet Installed in the Taylor-Wharton Plant.

WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMENT



FOUNDRY
EQUIPMENT CO.

This Industrial Week . .

- Nonintegrated Steel Makers Face Steel Shortage
- Lower Labor Productivity Lengthens Deliveries
- Steel Ingot Rate Drops 41/2 Points to 79 Pct.

ONINTEGRATED steel producers, those who purchase semi-finished steel from larger steel-makers for conversion into finished steel products, are facing not only rising costs but before the end of the year may have exceptional difficulty in obtaining steel.

During the war, the War Production Board had issued directives upon larger steel companies to furnish stipulated tonnages to the nonintegrated steel producers. These further conversion directives are being abolished effective in the fourth quarter with the result that the smaller steelmakers are scouring

Primary steel producers, hard put to produce sufficient semi-finished steel for their own needs, are turning a deaf ear towards orders for this profitless group of products. Over the long term the situation promises to deteriorate further as present contracts for semi-finished steel written several years ago on a low price basis expire. Nonintegrated mills will have difficulty in renewing contracts and there is immediate prospect that finished steel production by the nonintegrated mills which are not covered with orders for semi-finished steel in the fourth quarter may decline.

Although the OPA has studiously refrained from formally discussing the impending revision of the basing point system, there is a possibility that addition of new basing points near centers of production may be first published along with a new schedule of OPA prices on steel products. While this view is not uniformly held, it is said to represent a strong possibility. It is pointed out that OPA is not bound to issue price ceilings on the basis of past trade practices and that, with consent of steel producers, the sweeping basing point changes could be embodied in a new price schedule.

ACCORDING to last minute reports, chances are only fair for consumers to obtain electrical appliances for Christmas gifts this year. Despite the start which most manufacturers made on peacetime production after reconversion, special problems coupled with heavy demand indicate that distribution by mid-December will still fall far short of retailers' desires.

Because the domestic stockpile of refrigerators has been reduced to precariously low levels and because of the possibility of labor troubles slowing down manufacturing, there is a growing feeling that refrigerator inventory must be enlarged before distribution of all production is undertaken. Authoritative sources figure the unfilled market demand for refrigerators stands upwards of 4 million units which would provide about 18 months of capacity operation for the industry. The highest production ever reached in prewar years approximated 3.4 million units. The obsolescence rate in the industry is said to be figured at 10 pct per year, but efforts are being made to increase this by the introduction of new combined refrigerator fast-freezer boxes.

Steel rolling mill schedules on the mills of many producers are threatened through declining productivity and manpower shortage both in steelmaking and finishing departments. This may be an indication of a "stretch out the work" philosophy designed to retain overtime operations as long as possible. Several steel plants report a marked decline in labor productivity in the past two months. This, coupled with manpower shortages in finishing mills, has caused producers to fall behind delivery schedules particularly on critical cold-rolled sheets and highly finished products. The situation is so serious that several large producers are attempting to escape mentioning definite delivery commitments.

Despite these market uncertainties new orders continue on the upgrade recovering from a low point early in the month. September order volume approached that of August and the year to date is about 10 pct ahead of 1944. Uncertainties in the immediate prospects of steel consumers due to the disturbed labor situation are reflected for the first time in steel sales for the fourth quarter. High level steel production, however, for the fourth quarter seems assured barring labor difficulties within the steel industry

Manufacturing industries currently considering wage demands are carefully watching for a settlement in any one of a string of key industries which may set settlement terms in the other industries off like a pack of firecrackers. Some industries in the Midwest are disturbed lest price increases induced by higher labor costs may alter postwar sales potentials.

Isolated labor disturbances and scheduling difficulties caused the steel ingot rate to drop 4½ points this week to 79 pct of capacity. The ingot rate is expected to suffer further if coal labor troubles in the Pittsburgh district and oil worker strikes in the Chicago district are not settled promptly.

R AILROAD purchases are headed by 3450 cars placed by the Southern Pacific as follows: 1000 50-ton box cars to Pressed Steel Car Co., 750 50-ton auto box cars and 150 70-ton covered hoppers to General American Transportation Corp., 600 50-ton box cars to Pullman Standard Car Mfg. Co., 500 50-ton drop bottom gondolas to Bethlehem Steel Co., 250 70-ton hopper cars to American Car & Foundry, and 200 50-ton tight bottom gondolas to Ralston Steel Car Co. Pittsburgh and West Virginia Railroad has placed 10 covered hoppers with General American, and Alton has ordered 40 cabooses from American Car & Foundry Co.

Chicago and Northwestern ordered 2400 cars as follows: 800 70-ton gondolas from Bethlehem Steel Co., Johnstown, Pa.; 800 50-ton box cars from General American Transportation Co., E. Chicago; 300 50-ton flats from Mt. Vernon Car Mfg. Co., Mt. Vernon, Ill.; 500 50-ton auto box cars from Pullman Standard Car Mfg. Co., Michigan City, Ind.

- SECOND SURPLUS PLANT LISTING—The Office of Surplus Property of Reconstruction Finance Corp. has published its second advance listing of government-owned industrial plants available for disposal. This publication, which is dated Aug. 31, provides prospective buyers with full details of all available war-built plants.
- CC BOTTLENECK RATINGS—Only 675 requests from manufacturers or jobbers asking for assistance to obtain "bottleneck items" under CC ratings have been received by the Chicago Regional Office of the War Production Board since Aug. 21, when ratings first were made available. Of this number 295 requests came from the Chicago metropolitan area. Most of the items on which assistance was requested were sheet and strip steel, structural steel, electric switches, transformers, motors, steel sash, work gloves and machine tools. An increase in requests is expected after Oct. 1 when the former AA ratings are invalidated.

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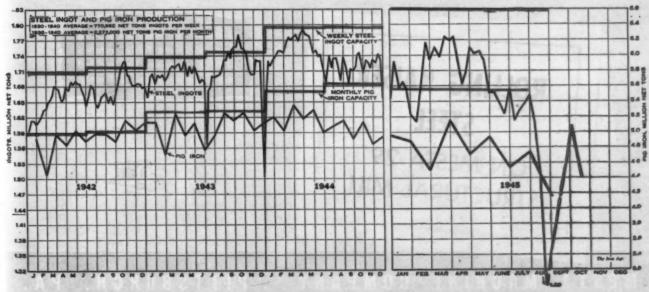
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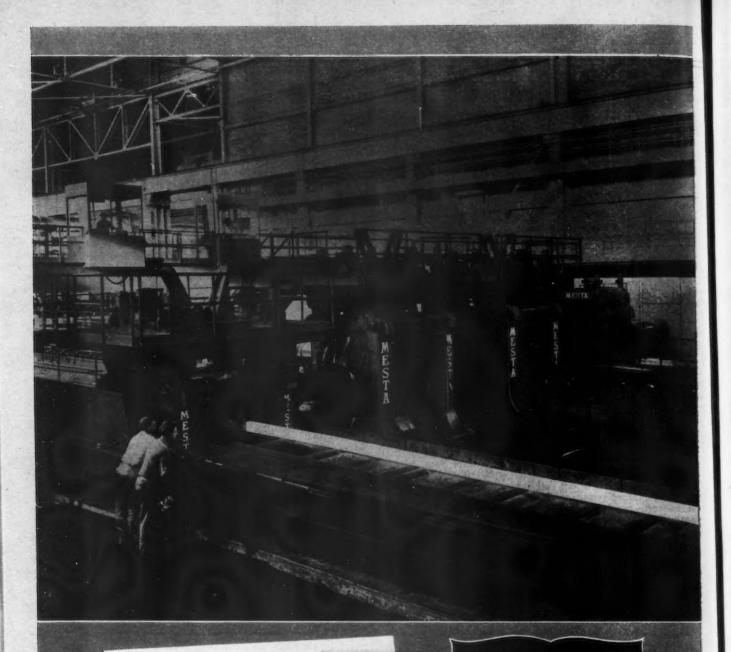
- FORD PARTS—Ford Motor Co. will begin construction of a new parts depot at Denver within a few weeks, part of a \$175,000.000 expansion program of the company which includes similar parts depots at Seattle, Houston and Des Moines.
- CMP EXPIRES—The Controlled Materials Plan formally expired Sept. 30 with the revocation by WPB of CMP Regulations 1 through 9A—the only ones still on the books. Directions issued to specifically named producers and warehouses before Aug. 21 were also revoked but directives to such producers and warehouses issued subsequent to that date are still valid insofar as authorized after Sept. 30 and not specifically modified or revoked, WPB said. Furthermore, WPB pointed out, all individual authorizations or directions issued pursuant to any CMP regulation or direction were revoked, with the exception of construction authorizations issued under Directions 1 and 3 of CMP Regulation 6 and any MM ratings assigned thereunder.
- LUKENS BACK PAY—Employees of Lukens Steel Co. and subsidiaries, By-Products Steel Corp. and Lukenweld, Inc., Coatesville, Pa., are to receive approximately \$454,000 in retroactive pay, as a result of the National War Lahor Board's directive of Nov. 25, 1944, the company said. Distribution will be made not only to present employees, but

- also to those who were working in the plants at the time covered by the NWLB's decision. Many who will benefit by back pay are now in the Armed Services.
- TAKE HOME PAY—Indicative of further reductions in take-home pay, the durable goods industries showed a decrease of 18½ million working hours in July, the Dept. of Labor announced recently. The study included the iron and steel, transportation equipment and machinery, but did not take into consideration the automotive and electrical appliance industries. Weekly earnings in the durable goods industries averaged \$50.60 in July, a decrease of 2.5 pct below the June level. This cut, the department pointed out, was due primarily to a 2 pct reduction in the average work week with the most substantial decrease noted in the automotive industry which also reported the only decrease in average hourly earnings compared with the previous year. August and September figures are expected to show more marked changes in take-home pay trends.
- STEEL MILL OIL RESERVES LOW—Reserves of fuel oil in Detroit steel mills are going steadily lower, and operations are being scheduled on a very close basis as a result. At both Ford Motor Co. and Great Lakes Steel Co. it was said there has not been any curtailment in operations as yet due to the short oil supply accruing from the strike of refinery workers, but both mills were watching the situation very carefully and said their schedules might be subject to change at almost any time. Absenteeism in Detroit due to inability of workers to drive their cars is not as great as was anticipated. Reappearance of car pools used during the war to conserve gasoline has been a feature of the strike period.
- OIL TANK SHIPMENTS AID STEEL—Curtailment of operations at the Gary Works of Carnegie-Illinois Steel Corp., which had been threatened this week through cutting off of fuel oil from district oil refineries on strike, has been temporarily averted through tank car snipments from other sections of the country. Continued unaffected steel operations now are assured through next week. A new fuel supply uncertainty was injected, however, through the Lynchburg, W. Va., coal strike, which supplies coking coal to the plant. Coking coal inventories approximate five days' supply.



Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia .	Cleveland	Buffalo	Wheeling	South	Detroit	Wost	Ohio River	St. Louis	East	Aggregate
September 25 October 2	68.5° 70.0	88.5 91.0	87.5 74.5	90.0 78.5	89.5 89.5	99.0° 99.0	75.0 72.0	95.0 95.0	93.0 95.0	56.5 37.0	89.0 81.0	67.5 67.5	85.0 85.0	83.5 79.0



ROLLING KAISER
STEEL
ON MESTA 29"
STRUCTURAL MILL

Mesta 29" Structural Mill, showing Traveling Tilting Table, installed at Kaiser Company, Inc., Iron and Steel Division, Fontana, California.



MESTA MACHINE COMPANY . . PITTSBURGH, PA.

Electrical Appliances Outlook for Christmas Only Fair

Detroit

• • • Chances are only fair for consumers to obtain electrical appliances for Christmas gifts this year. Despite the fairly ready start which most manufacturers made on their peacetime production after reconversion, special problems which are holding up some manufacturers, coupled with the tremendous demand for all such household needs, indicates that distribution by mid-December will still fall far short of retail desires.

Somewhat of a shadow is being cast over refrigerator distribution by a new turn of thinking within WPB. This is to the effect that the domestic stockpile of refrigerators has been reduced to precariously low levels, probably below 15,000 units, and that the possibility of labor trouble may slow down manufacturing which was expected to rise very quickly during the latter months of this year. Such being the case, there is some growing feeling that the stockpile must be enlarged before distribution of all production is undertaken.

Confident refrigerator people figure the unfilled market demand today stands upward of 4,000,000 units, which would provide about 18 months of capacity operation for the industry. The highest production ever reached in prewar years approximated 3,400,000 units. After that unfilled immediate market is satisfied, output will decline to lower levels largely based on replacement of obsolescent models. The obsolescence rate in the refrigerator industry is figured at ten pct per yr.

Efforts will be made by the entire industry to speed this rate of obsolescence by introduction of new combined refrigerator-fast freezer boxes. This is likely to be the major postwar development of the industry, and models of this sort can be expected to appear on the market initially during the coming year. For the most part these freezer units will hold temperatures down to 0°F, which is satisfactory for preserving foods at least six months.

In addition, a growing market is anticipated for boxes which will hold cold at a level of -10°F, satisfactory for preserving food several years. Virtually all refrigerator makers, together with producers of commercial

By STAN BRAMS

refrigeration, will be in the market

with sales entries of this sort.

One factor which is worrying the refrigerator people is the OPA position on pricing. As for other major consumer products, OPA is endeavoring to maintain prices at the 1942 level, although the indication is that each company will determine its recommended price on a basis of individual increases in labor and materials cost. However, costs have increased to the extent that many refrigerator makers say they will lose

money if they must sell at 1942 levels, and accordingly their enthusiasm for large scale production is somewhat dampened today.

Range manufacture, on both gas and electric models, is progressing well and there should be fair distribution of these products by Christmas time. Availability of sheets for this production, as for refrigerator output, is not entirely satisfactory today, but the appliance producers appear to be obtaining enough to forecast their

initial production runs without undue difficulty.

Similarly, washing machine manufacture is getting under way today and will be steadily enlarged. In this branch of the electrical appliance business, hopes are that the development of completely automatic washers, along the lines of the Bendix, will serve to obsolete prewar washers in

use to the extent that the replacement market will be much more substantial than in the past.

Sewing machines are now beginning to emerge in small quantities from erstwhile war plants, the WPB announced recently. This source expected that some 40,000 machines would be made during the last quarter of this year, a fourth of them from parts on hand and the balance from new materials. Before the war output ran around 800,000 machines a year, and it is expected that this rate will be reached and surpassed next year, when strip steel and malleable and gray iron castings become more available.

In 1941 the sewing machine industry consumed 24,689 tons of iron and steel for new machines and attachments, 225 tons of copper, 12,876 lb of lead, 10,400 lb of nickel, 175 tons of aluminum, 20 tons of zinc, 225 tons of phenolic resin, 2200 lb of stainless steel, 12 tons of alloy steel, 560 tons of cadmium and some rubber.

Bethlehem to Build Nine Refrigerated Vessels

Boston

• • • U. S. Maritime Commission in Boston has approved bids received by the United Fruit Steamship Co., a subsidiary of the United Fruit Co., from the Fairfield, Md., plant of the Bethlehem Steel Co. for construction of nine fully refrigerated vessels at a cost of \$2,799,000 each.

CONSUMERS' ITEM: As the last of the landing gears for airplanes are in crates ready for shipment, washing machine parts start down the assembly line of the Menasco Mfg. Co. From all appearances, these small home washers will soon be on the way in volume production.



Canton Area Sees Opening Of Local CIO Steel Wage Increase Drives

Canton, Ohio

• • • Taking their cue from fellow unionists in other parts of the country, Canton area CIO-United Steel workers unions opened a drive for a flat \$2-a-day wage increase.

I. W. Abel, district USW director, said the union will resume negotiations for the pay boost for employees of Timken Roller Bearing Co. plants in Canton, Wooster, Columbus and Mount Vernon soon. USW officials also were scheduled to meet with officials of Republic Steel Corp.'s Truscon Steel Co. Screen Division, to present their demand for a \$2-a-day pay boost.

The local CIO chieftain also announced that he has served notice on 16 other steel firms in the Canton district that the union is ready to start negotiations with them for such increases.

In the Timken case, it appears the union has decided to reject the company's Aug. 24 offer of a voluntary ten pct wage increase for production and maintenance workers at all its plants. This raise offer, coming shortly after Timken announced a return to the 40-hr week, also applied to salaried workers. Because these are not covered by the company union contract, they got pay raises on Aug. 27.

In replying to the Timken offer, Philip Murray, national CIO president, assured the Timken management that a USW negotiating committee would meet with company officials in the near future. He also disclosed that USW's wage policy was under consideration. The \$2-a-day pay increase demand for Timken and other steel firms was agreed on by a USW wage policy committee in Pittsburgh September 11.

In announcing the Timken wage negotiations, Mr. Abel said other union demands will be postponed until the National War Labor Board hands down a decision on issues it reviewed at a hearing Sept. 19. Union negotiators said they would take the Timken offer under advisement.

Canton steel firms that were mailed notices of the USW's readiness for negotiations were: Union Metal Mfg. Co., Canton Malleable Iron Co., Canton Stamping & Enameling Co.,

Barium Steel Corp., Republic Steel's Truscon Steel Co., and the Canton-Massillon road plant of Canton Drop Forging & Mfg. Co.

The Pittsburgh national USW office will handle negotiations for these firms: Republic Steel Corp., Superior Sheet Steel Co., United Engineering & Foundry Co., Carnegie-Illinois Steel Corp., Republic Steel's Union Drawn Steel Division at Massillon and Babcock-Wilcox Co. and American Steel Foundries, both at Alliance.

The Canton district USW office will handle negotiations with the Massillon Steel Castings Co. at Massillon and the Appliance Mfg. Co., Alliance Machine Co., Alliance Structural Co. and Alliance Engine Co., all at Alliance. It also will negotiate with these steel firms: Reeves Steel Mfg. Co., and Greer Steel Co. of Dover; Allied Engineering & Machine Co., and LaDel Conveyor & Mfg. Co. at New Philadelphia and Heller Bros. File Co. of Newcomerstown.

Youngstown Operating Rate: Furnaces Close

Cleveland

• • • A strike in the Pennsylvania coal fields lowered Youngstown district steel production an estimated 12 pct, as operations at the Youngstown Sheet & Tube Co. and Republic Steel Corp. mills were reduced.

Earlier, the Youngstown Sheet & Tube Co. cut coke oven operations

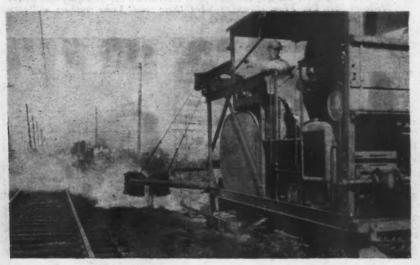
75 pct, and banked the blast furnace at Hubbard and two blast furnaces at the Campbell plant. Bessemer operations have been reduced and will vary between 50 and 75 pct and openhearth capacity has been reduced, with three furnaces down at Campbell and four at Brier Hill. Of the company's seven blast furnaces, three are now operating. One at Brier Hill has been down since VJ Day. Youngstown Sheet & Tube's coal stocks have been cut in half, including a loss of 15,000 tons to the government for shipment overseas.

Simultaneously, the Republic Steel Corp. announced that one blast furnace at Youngstown and another at Cleveland were being shut down, leaving four blast furnaces, one Bessemer and 12 open hearths operating. Company officials said that further reduction will be necessary if there is no change in the coal situation. About 12 days' supplies are on hand or in transit.

At Warren, Republic is continuing operation of one blast furnace and seven open hearths but officials reported that only a little more than a week's supply of coal is on hand. Strikes at three of the company's Pennsylvania coal mines which account for more than two-thirds of the coal supply in the north have made the move necessary.

Carnegie-Illinois' Ohio Works is continuing to operate six blast fur-

WEED DESTROYER: An oil-burning motor-driven destroyer has been devised to keep down the thick growth of vegetation which would menace fast trains by pouring flames from its five blowers. This does not endanger railroad ties, fences or forests.



naces, one Bessemer and 14 open hearths and the Farrell works, one blast furnace and nine open hearths. Company officials said that some coal was on hand and only a continued strike in the mines would affect them.

Sharon Steel was operating one blast furnace, four open hearths and an electric furnace and according to company officials, may even increase open hearth operations at the Lowell-ville plant late last week. Officials said that sufficient stocks of coal and oil were available for the immediate future, but indicated that if the situation was not improved, cutbacks will become necessary.

GE Estimates Doubling Of Appliance Plant Payrolls

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• • Some idea of the demands to be made on the electrical equipment manufacturers during the next few years was had at a meeting of General Electric Co. executives and the executive committee of the Pittsfield Workers' union (C.I.O.)

Officials stated that schedules call for employment of 10,186 people at the Pittsfield plant alone during the immediate postwar years, contrasted with 5113, the 1936-40 average payroll, and that a substantial number of workers other than the 10,186 will be taken on at other communities where plants will be operated by the Pittsfield plant executives.

Plans call for the greatest production of products in the company's history; something more than twice prewar production. Needed new manufacturing space will be acquired during the next three years.

Western Electric Looks At Pratt & Whitney Facility

Boston

• • • Western Electric Co., according to John J. Hagerty, manager of the Boston office of the RFC and the DPC, has inspected the DPC plant in East Longmeadow now occupied by the Pratt & Whitney division of the United Aircraft Corp. with a view to possible purchase. The plant is one of several which Pratt & Whitney will give up now that the need of war production has passed. Should Western Electric take over the plant it may be several months before it can gain occupancy. Last year Western Electric did a business of \$788,000,000.

Steel Production Is Not Yet Hamstrung by Western Coal Strikes

Pittsburgh

• • • The mine strikes in the Western Pennsylvania area continued through another week, but there have been no real difficulties as yet in so far as steel operations are concerned. Several companies have begun to tighten up a little on the use of coal, but there have been no heavy cutbacks of operations or layoffs in the mills because of the lack of coal.

During the early days of the strike, the non-metallurgical mines were mainly affected, but gradually the metallurgical coal operations are closing down. This past weekend, three of the U. S. Steel Corp.'s metallurgical mines, the new Robena mine in Greene County, and the Bridgeport and Maxwell mines in Fayette County curtailed operations. The Robena mine, which when in full operation will be the largest mine of its type in the world, went completely down, while the other mines are only partially down.

Coal stocks that are normally built up at the mills for winter operations, during which time there is normally very little coal brought down river, are being eaten into now because of the strikes. While these stocks are a salvation at the present time, the full effects of the present strikes, if settled within the next two weeks, might not be felt until later in the winter when transportation is tied up and the mills can't get coal from the mines.

While there seems to be no letup in the mine strikes, one big strike in Pittsburgh ended this week. Westinghouse Electric Corp.'s white collared workers have returned to work after a three week layoff. The return to work was practically complete, when the company agreed to meet with the worker representatives on to DSXX discuss wages, and rate inequalities. However, the main issue of the strike, bonuses, is back in the hands of the War Labor Board, and it may be some time before any settlement will be made on this issue.

National Tube Co.'s McKeesport plant returned to full operation last weekend, and the strikes in the seamless tube mill, tinplate dept., and several other specific points at the Jones & Laughlin Steel Corp.'s Aliquippa works ended. The National Tube strike affected openhearth, bessemer, soaking pit, and blooming mill output, whereas the strikes at J&L were mainly in specific finishing departments.

PRECISION GRINDING: Shefield Precisionaire air flow gages in quantity use at a prominent manufacturing plant. Each of the many internal grinders shown here is equipped with a Precisionaire gage mounted on the machine head where it is readily seen by the operator for quich accurate readings. Inset at lower right is a close up view of the gage in use for hele measurement in the identification room. Each bore is inspected for size, and is classified and marked with the proper designation.



TC&I Plans to Include Opening New Coal Mine

Birmingham

• • • A broad plan for further development of the Tennessee Coal, Iron & Railroad Co.'s sources of raw materials, including the opening of a new coal mine according to the company, which is a U. S. Steel Corp. subsidiary.

In addition to the new coal mine, the program includes the restoration of two iron ore slopes to production, the construction of an open hearth furnace and the replacement of a battery of coke ovens to maintain present coke capacity.

The new coal mine will be opened in the American seam in the Concord area. It will produce an estimated 4200 tons of coal per day at its ultimate capacity. Its major features will include a 2200-ft hoisting slope, a 1400-ft material slope, an 18-ft diameter shaft, nine miles of railroad, and the customary surface facilities. Improvements looking toward increased production also will be made at the company's Edgewater and Short Creek coal mines.

The new battery of 63 modern coke ovens will be installed at the Fairfield Coke Works. One of the older batteries is expected to be removed when the new battery is completed, he explained.

One additional open hearth furnace will be constructed at Fairfield Steel Works, raising the company's steel ingot capacity 120,000 tons per year.

Work on the project will begin immediately and will require perhaps 18 months for completion.

PAW Drops Some Controls

Washington

• • • Coinciding with the WPB action in lifting of restrictions effective Oct. 15 on the use of materials for all types of construction, PAW has announced that all restrictions on the use of materials or equipment for the construction of filling and bulk stations used in the distribution of petroleum products will be removed on that date. PAW will take this action by rescinding Petroleum Administrative Order 12. This order places a limitation of \$10,000 on the cost of pumps, tanks and other equipment used in the construction of a filling station and a limitation of \$40,000 on the total cost at a bulk plant.

Republic Purchases Large Barrel Plant

Cleveland

• • • Purchase of the Stevens Metal Products Co., Niles, Ohio, one of the largest individual barrel plants in the country, by the Republic Steel Corp. was announced this week.

Established in 1916, Stevens Metal Products has a long history in the barrel business, with production facilities for a wide range of steel barrels and drums, and other metal specialties, including cable reels. Acquisition of this plant provides Republic with a direct outlet for about 40,000 tons of flat rolled products a year in the manufacture of barrels and drums.

Normal peacetime production of the plant, which is entirely under one roof, is in the neighborhood of 75,000 drums a month. During the war, however, production was closer to 100,000 drums a month and along with it, the company had a sub-contract for shell casings.

Stevens barrels and drums were made in a variety of sizes, from 10 to 110-gal. capacity, and the types included chemical, hot dip galvanized, regular oil drums, stainless steel drums, nickel drums and shop barrels.

Clarify Status of DPC Metalworking Plants

New York

• • The following DPC steel and nonferrous metal plants have been reported sold, leased, or in advanced stages of negotiation by the Reconstruction Finance Corp. in a recent report.

Plants in Advanced Stage of Negotiations

Wartime Operator	Location of Plant	Wartime Product	Cost of Plant
STEEL Atlantic Steel Castings. Cooper Alloy Foundry Co. Copperweld Steel Co. Copperweld Steel Co. Ladish Drop Forge Co.	Chester, Pa. Hillside, N. J. Warren, Ohio Warren, Ohio Cudahy, Wis.	foundry cupola and converters copper ingots special machined-turned steel forgings for alreraft	\$1,068,000.00 388,324.96 9,587,000.00 1,754,009.00 10,569,000.00
NONFERROUS Aluminum Co. of America Chase Brase & Copper, Inc Greenfield, Samuel & Co Revere Copper & Brass. Reynolds Alloys Co	Kansas City, Mo. Cleveland, Ohio Buffalo, N. Y. Baltimors, Md. Sheffield, Ala.	aluminum brase shell cases and cups zinc oxides condenser tubes finished bars and rods	6,715,000.00 20,615,000.00 72,000.00 3,615,000.00 21,276,000.00

Plants Sold

Wartime Lessee	Location of Plant	Wartime Product	Purchaser	Cost of Plant	Sale Price
STEEL Bethlehem Steel Corp Eaton Manufacturing Co	Bethlehem, Pa. Steelton, Pa. Lackawanna, N. Y. Lackawanna, N. Y. Sparrows Point, Md. Bethlehem, Pa. Massillon, Ohlo	iron and steel products iron and steel products bullet core steel rods	Bethlehem Steel Corp. Eaton Manufacturing Co.	\$6,538,648.44 2,885,245,77 4,302,957.34 4,180,644.28 1,689,724.30 629,352.24 528,480.00	\$6,538,648.44 2,885,245.77 4,302,957.34 4,180,644.28 1,669,724.80 629,352.24 291,302.00
NONFERROUS Canton Drop Forging Co Central Foundry Go Molybdenum Corp. of America	Massillon, Ohio Anniston, Ala. . Empire, Col.	aluminum cylinder heads magnesium castings exploration by shaft	Massifien Aluminum Co. C. C. Pope, Anniston, Ala. Motybdemum Corp. of America	793,797.00 72,865.46 351,503.99	275,000.00 30,000.00 351,503.99

Brazil's Pig Iron Production Grows

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• • • Brazil produced a total of 122,-685 tons of pig iron during the first six months of 1945, according to the Industrial Production Unit of the State of Sao Paulo. The country has 24 blast furnaces, of which 19 are in the State of Minas Gerais, 4 in Rio de Janeiro, and one in Sao Paulo. Production of pig iron has increased steadily in volume, rising from 58,559 tons in 1934 to 247,680 tons in 1943.

1945 PIG IRON PRODUCTION—BRAZIL

	Steel	Foundry	Total
January	11,363	11,707	23,070
February .	10,107	7,258	17,365
March	11,397	8,575	19,972
April	9,651	8,898	18,549
May	8,984	11,407	20,391
June	10,902	12,436	23,338
Total	62,404	60,281	122,685

Major Expansion Planned

Muskegon, Mich.

• • Wisconsin Motor Corp., a majority-owned subsidiary of Continental Motors Corp., has current unfilled orders in excess of \$17 million, a record peacetime level.

As a result, immediate expansion of manufacturing and testing facilities to meet schedules is planned by H. A. Todd, Wisconsin Motors president. Plant facility enlargements costing about \$500,000 are scheduled for completion in January, and at that time output potential will be increase 50 pct.

The postwar engine production of the Wisconsin company will include four new V-type model engines with a power range from 8 to 33 hp, augmenting the two V-type models produced before the war. The Continental subsidiary is the world's largest manufacturer of air-cooled heavy-duty industrial engines.

Great Lakes Steel Plans Quonset Hut Sales to Civilians

Detroit

• • • • Quonset huts for civilian use will be placed on sale immediately by the Great Lakes Steel Corp. Stran-Steel Div. A distribution-dealer setup is now being perfected.

The two basic sizes most employed by the Navy, 20 x 48 ft and 40 x 100 ft, will be continued. Retail prices are approximately \$900 for the "Quonset 20" and about \$3000 for the larger "Quonset 40."

Each structure contains between 10 and 11 tons of steel, ordinary galvanized sheet for the covering and copper bearing steel for the framing. The framework is assembled with bolts and screws, and the sheet metal together with wood or lath as may be desired, inside and out, is nailed to the arch-ribbed framework. A wide variety of rural uses is envisioned for the huts. They may be used for barns, rural schoolhouses, farm outbuildings, and for habitation.

A secondary, though also most substantial, market is expected to arise from industrial uses. One Quonset hut has been set up as a paymaster office at Great Lakes Steel, epitomizing the kind of use to which it may be put; this building contains a second floor inside the structure, and is completely finished and insulated for include as a machine shop, bank, hosuse in all weather. Other factory uses pital, storage space, etc.

Output of Steel And Iron Rising Slowly In Czechoslovakia

Washington

• • • Iron and steel production is increasing slowly in Czechoslovakia, according to preliminary estimates of the Czechoslovak Ministry of Production. This rising output follows the trend of general improvement in economic conditions in that country.

Kladno, near Prague, has the main iron ore deposits in Czechoslovakia. Although the ore is of poor quality (30 pct), Kladno produced 20 pct of the Czechoslovak iron and steel in the prewar period. It is now estimated that it produced 21,000 tons of iron and 35,000 tons of steel. These are net figures and do not duplicate for iron made into steel.

Trinec in Tecin is producing very little and now needs iron ore. When it reestablishes its capacity it will greatly increase Czech production.

Stocks of iron ore on hand are equal to 30 days of the prewar normal rate of production, or 60 days at the present rate. To reestablish full production 2,000,000 tons of high grade iron ore are required annually. It is believed that Austria has 1,000,000 tons available and 600,000 tons on hand now, and it is hoped that railroad transportation can be started again to ship coke from Moravska-Ostrava in Czechoslovakia to Erzberg in Austria in exchange for iron ore.

. Coking coal from Moravska-Ostrava is now being produced at the rate of 4,000,000 tons annually, as compared with nearly 13,000,000 tons in 1937, or approximately 30 pct of prewar production.

G. M. Diesel Division Is Standby Cleveland

e e Plans to retain facilities of the General Motors Gorp., Cleveland Diesel Div. in readiness to resume operations immediately, should the need arise, were announced by the Navy Bureau of Ships in Washington. In Cleveland, the announcement was construed to mean that it would be maintained on a stand-by basis, maintained by General Motors, and ready to proceed at once on new Navy contracts.

Neither General Motors nor local Navy officials have received official notification of the decision.

Wartime Lessee	Location of Plant	Present Lessee	Cost of Plant
STEEL Lake City Malleable, Inc Crucible Steel Casting Co Omaha Steel Works. Pittsburgh Steel Co	Ashtabula, Ohio Milwaukee, Wis. Omaha, Nebr. Allenport, Pa.	Lake City Maileable, Inc. Crucible Steel Casting Co. Omaha Steel Works Pittsburgh Steel Co.	\$5,080,604,06 2,042,389,00 669,000.00 819,000.00
NONFERROUS Aluminum Forginge Beryilium Corp. of Pa. Behn Aluminum & Brass Corp Bohn Aluminum & Brass Corp Cleveland Graphite Bronze. Precision Castings Co. Revere Copper & Brass Reynolds Metals Co. Tantalum Defense Corp	Erie, Pa. Tomple, Pa. Los Angeles, Calif. Adrian, Mich. Cleveland, Ohio Fayotteaville, N. Y. Baltimore, Md. Louisville, Ky., No. Chicage, Ill.	Aluminum Forgings Beryllium Corp. of Pa. Bohn Aluminum & Brass Corp. Bohn Aluminum & Brass Corp. Cleveland Graphite Bronze Precision Castings Co. Revere Copper & Brass Reynolds Metals Co. Tantalum Defense Corp.	3,702,448,00 2,512,507,79 8,728,000,00 18,335,000,00 8,135,134,16 488,573,59 7,775,925,00 5,001,850,00 5,343,574,00

Borg-Warner Prepares New Fully Automatic Transmission for Ford

Detroit

• • • Machines and tooling are being procured by the Detroit Gear Division of Borg-Warner Corp. to begin production next year on a new automatic transmission. Equipment and facilities in excess of \$12,000,000 are expected to be required for the new unit.

Indications were that the new transmission would go into Lincoln and Mercury cars, and perhaps into Fords as well. However, due to delays in manufacturing, it was not expected that the automatic transmissions would make their appearance until the 1947 models.

Howard E. Blood, president of the Detroit Gear Division and vice-president of Borg-Warner, said the new transmission resulted from more than ten years of research and development, and combined the best features of a great many such units.

Fully automatic, the new transmission has four speeds forward and one in reverse, and is said to be considerably simpler than other developments of the sort. Only seven gears are required to provide the various speeds. Shifting from low gear through the four speeds to high requires no manipulation nor attention from the driver. When going up steep hills or slowing down in traffic, shifts downward are

likewise automatic, quiet and almost imperceptible. When the car is brought to a full stop the motor is entirely disengaged.

Detroit Gear engineers were assisted in the development by the engineers of the Borg & Beck Division and Long Mfg. Division of Borg-Warner Corp.

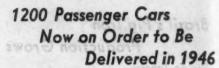
Army to Sponsor Lab For Combat Vehicles

Detroit

• • • The War Dept. will spend \$7,000,000 to convert the Detroit Tank Arsenal, operated during the war by Chrysler Corp., into a combat and transport vehicle testing laboratory. Bids for the expansion will be asked toward the end of the year, with construction expected to take about six months.

Indications are that the personnel of the Office of the Chief of Ordnance-Detroit will be entirely shifted to the arsenal next year. The new project, therefore, will become the first installation for tank and vehicle research work during peacetime ever sponsored by the Army.

The Naval Gun Plant at Centerline, a mile away from the tank arsenal, will continue in use. This operation is managed by Westinghouse Electric Corp. Manufacture of guns, gun mounts and components will be localized there.



Washington

• • • President John J. Pelley of the Association of American Railroads, following a meeting of the association's board of directors on Sept. 28, the first since the end of hostilities, told of both the war job the carriers have to finish and of planned improvements in plant and equipment that will better service in the future. The war, he said, demonstrated how essential railroads are to the nation, their technological progress and the importance of investment in them in providing transportation at lower cost.

"Technological progress demonstrated by results during the war will continue in peacetime at an accelerated rate," said Mr. Pelley. "Much of this progress will not be conspicuous, for that is the way with most changes in railroading. To the naked eye, for example, steel rail rolled today looks about the same as ever, but, as a result of research, it actually has a rate of breakage per year of service only about one-fifth as high as that of rail rolled only 15 years ago. And that is but one detail in the composite picture of progress which enabled the railroads, in this war, to do twice as much work per day with nearly one-third less equipment, and to do it immeasurably better than during the first World War.

"The research which made such results possible is going ahead today on a broader front than ever before. Individual railroads, the companies which supply the railroads with equipment and materials, and the technical divisions and study committees of the Association of American Railroads, all are engaged in the search for better ways to carry on the railroad business."

Railroads are going ahead with their plans for further improvements in the alignment and structure of track, in signals and communications, in yards and terminals, in shops and offices, in operating methods, in every phase of the business, Mr. Pelley pointed out. The changes most likely to attract attention, however, were said to be those in locomotives and cars.

"There are now on order about 1200 new passenger coaches," Mr. Pelley said. "Those new cars, most of which



\$12,000,000 TRANSACTION: Powel Crosley, Jr., right, accepts checks totaling \$12,-000,000 from Irving B. Babcock, left, of New York, president of Aviation Corp., which recently acquired the Crosley Corp., including radio station WLW, Cincinnati.

116-THE IRON AGE, October 4, 1945

are expected to be delivered in 1946, will feature smart, spacious comfort. They will embody desirable changes in design and materials suggested by pre-war experience with earlier streamlined cars, by the experimental service of new types of sleeping cars and coaches built just before the war, and by direct personal checking of the preferences of passengers and prospective passengers.

"Trains will be pulled not only by the newer types of power, such as electric and Diesel locomotives, but also by improved steam locomotives, including both new designs of reciprocating engines and others driven by turbines. Just as the 1945 railroad is a machine very different from that of 1920, as is evidenced by its performance record, so the railroad of tomorrow will be different from that of today."

Navy to Operate Canton Ordnance

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• • • Steps are being taken by the Navy to assume operation of its \$22,-000,000 Canton Ordnance plant, which has been under Westinghouse Electric Corp. management for the last four years, Rear Admiral G. F. Hussey told the House Naval Affairs Committee in Washington recently.

Recently, Comdr. Albert N. Connett, officer in charge of the plant for the Navy, said that he had been officially notified that the transfer would take place at an early date.

Admiral Hussey also told the committee that the Navy has recommended that storehouses should be constructed at the Canton Naval Ordnance plant, which was originally built by Westinghouse, and several other ordnance plants the Navy plans to take over. The storehouses are needed for modern equipment that will be taken from merchant vessels and decommissioned ships and stored at facilities engaged in overhauling and alteration work.

Bantam Sets Up Line For Heavy Trailers

Pittsburgh

• • • Heavy cargo trailers will be manufactured by the American Bantam Car Co. at Butler, Pa., where production lines are being established for trailers for export in capacities of a half-ton, one ton, and two ton.

Thompson Products Forms Five Divisions

Cleveland

• • • Frederick C. Crawford, president of Thompson Products, Inc., announced a sweeping reorganization of manufacturing operations in local plants of the company this week.

Formal establishment of five divisions, each a complete business organization, headed by a manager solely responsible for its operations will result from the reorganization. The divisions, and their managers are: light metals, Arthur Townhill; parts and accessories, Paul P. Johnson; piston ring, Elmer W. Siegling; special products, Leonard W. Reeves and valve and jet propulsion, Harry D. Bubb.

Predicting a volume considerably higher than anything ever experienced in prewar years, Mr. Crawford said the realignment is being made to place specific responsibility on Cleveland division managers for the full development of products under their jurisdiction.

A market survey shows the com-

WIRE-CORDED TIRES: L. R. Jackson executive vice-president of the Firestone Tire & Rubber Co., with one of the company's new wire-corded tires, cut away to show the metal fabric of which the cordbody is composed. The new tire, designed for heavy duty use on trucks, is practically blowout proof.



pany's sales for the next four years surpassing all earlier expectations, and the company has reasonable expectations that within the next 15 to 18 months over-all sales will reach a \$50,000,000 to \$60,000,000 a year pace. In 1939, the company's best prewar year, sales totaled slightly less than \$16,000,000.

It was said that employment in Thompson plants will reach a "normal" postwar level somewhere between 8,000 to 10,000, with annual payrolls ranging upward from \$20,-000,000.

Stop Scrap Allocation

Washington

• • • Allocation of scrap iron and steel to mills and foundries was discontinued Oct. 1 by WPB. It was pointed out, however, that all allocations which already have been issued under Order M-21 will remain in effect until the date of their expiration.

The WPB Steel Division still retains the authority to allocate scrap iron and steel under the order, but this power will only be used if it appears that production will be retarded by lack of scrap.

Allocation activity in recent months has been confined to railroad scrap.

Elect Weinstein President

Chicago

• • • Harold Weinstein, Calumet Iron & Supply Co., has been elected president of the Chicago Chapter of the Institute of Iron & Steel Scrap, Inc., succeeding William Pohn, who has held the post for the past six years. Frank Grossman, Grossman Brothers Co., Milwaukee, is first vice president; Frank Cohen, D. R. and F. A. Cohen, second vice president; A. J. Clonick, Clonick Steel Co., third vice president; Henry Rosenthal, Briggs & Turivas, treasurer, and Harvey Kaplan, M. S. Kaplan Co., secretary. The chapter will sponsor the Institute's national convention here Jan. 21, 22, and 23, replacing a previously selected St. Louis site.

Correction

New York

oo In the reference to the basing point established by the Joslyn Mfg. and Supply Co. at Ft. Wayne for stainless steel bars (Sept. 20, p. 112), the name was misspelled as Gosly Mfg. and Supply Co.

Alcoa Competition First in Aluminum Plant Disposal

Washington

• • • Competitors of the Aluminum Co. of America will have first choice in acquisition of government-owned surplus aluminum plants and equipment, according to recommendations submitted to Congress by Surplus Property Administrator W. Stuart Symington on Sept. 26.

Recognizing that conditions beyond its control may make the recommended program impossible of accomplishment which, in the absence of action by the courts, would leave the whole problem for solution by Congress, the report emphasizes that such disposal policies seem more likely to promote competition and achieve the purposes of the Act than any others which have been submitted.

A number of domestic corporations as well as representatives of foreign corporations and governments have expressed interest in leasing or purchasing various plants, the report states, discussions with all prospects to date having aided in the formulation of disposal policies.

Alcoa has already stated that it would lease or buy the Hurricane Creek, Ark., alumina plant and purchase the Baton Rouge, La., plant for removal to the Pacific Northwest.

Alcoa would also acquire the Jones Mills, Ark., Troutdale, Ore., and Massena, N. Y., reduction plants.

The American Smelting & Refining Co. has expressed an interest in acquiring Hurricane Creek and either one of the above reduction plants. Reynolds Metals Co. has expressed interest in securing all these plants and one sheet mill in addition. Kaiser Co., Inc., is interested in developing a broad program, the report states, particularly the Spokane reduction plant and rolling mill.

The Columbia Metals Corp. and the Bohn Aluminum & Brass Corp. wishes to lease the reduction plants at Troutdale and Spokane. Olin Industries, Inc., have expressed interest in some reduction capacity provided bauxite supplies are assured on a competitive basis. Little interest thus far has been shown in the larger fabricating plants.

Prospects other than Alcoa, the report points out, have generally indicated that they wish to lease alumina and reduction plants and eventually

acquire them by purchase. They also would require government assurance on alumina supply at a price competitive with Alcoa. Liberal rental terms minimizing risks of loss have been asked. Some would prefer integration of government stockpiling operations so as to permit sale to the government until commercial markets are built up.

In discussions to date, Alcoa indicated that it did not need the government plants but would take them in order to remove the government from the aluminum industry, the report states.

Alcoa's proposals were rejected by the government because, the report declares, it would have increased Alcoa's monopoly in the primary metal. In acquiring three of the four best reduction plants and controlling the Hurricane Creek alumina plant, Alcoa would take government plants off the market and discourage employment opportunities which is the primary concept of the Surplus Property Act itself.

Other points in the recommended program are as follows:

Alcoa would be given the opportunity to take over certain facilities, subject to approval of the Department of Justice, but only on terms of lease or sale that would preclude competitive advantage.

The government will maintain in

standby condition plants needed for the national defense.

Other facilities will be offered to private enterprise to be used for purposes other than aluminum production.

Plants and equipment not otherwise needed will be exported to members of the United Nations subject to approval of the State, War and Navy Depts.

These priorities may be disregarded, the report points out, where research can be fostered by selling, lending or donating equipment that otherwise has no industrial use, provided the fruits of such research become public property.

Where key plants are involved, the report states, it is essential that they be disposed of to bidders who have the organization, experience and financial resources affording best prospects for continuing operations and maximum production in the industry. Preference will be accordingly given.

Specific policies for disposal of individual plants contain the following provisions:

The Hurricane Creek aluminum plant will be offered to an Alcoa competitor under terms that guarantee sale of alumina on a competitive basis.

The Baton Rouge plant will go to an Alcoa competitor but, if none can be found who is willing to operate it at the present location, consideration will be given to removing it entirely or in part to the Pacific Northwest for sale to a competitor. Finally, if the foregoing conditions cannot be complied with, the plant will be offered to Alcoa for removal to the Northwest, subject to Department of Justice approval.

Reduction plants at Jones Mills, Troutdale, Spokane and Tacoma will be offered to Alcoa competitors. Undisposed-of plants will be retained in standby condition until the aluminum market permits economical operation.

The Massena plant will be offered to Alcoa subject to Department of Justice approval, on terms conferring no competitive advantage. It will be retained by the government pending determination of possible disposal to others when low-cost power supply becomes available.

The Maspeth, Burlington, Los Angeles and Riverbank reduction plants,

ROUGH RIDE — Since real leather shoes cost \$50 and more, the citizens of Rome are willing to ride in a three-wheeled truckbed vehicle called motofurgoncino, which carries standees and two passengers on either side of driver in rush hours.



if unacceptable to any bidders, will either be held in standby condition or disposed of according to the recommended priorities, the report says.

Scrambled facilities in private plants will be disposed of by giving plant owners first choice. Those in excess will be disposed of according to the priority pattern.

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Anants, Lime-soda-sinter facilities which are adjuncts to Alcoa-owned plants located in Mobile, Ala., and E. St. Louis, Ill., will be offered to Alcoa subject to Department of Justice approval.

In disposals of fabricating plants, the report states, holders of valid options or rights of first purchase will have first choice in exercising their rights. Operators of government reduction plants will be granted first choice on plants not under option and second choice on plants subject to prior rights of others in order to enable them to integrate more favorably. Third choices will go according to the priority pattern.

Rental terms and sales prices, the report points out, will be fixed with due regard to earning ability of the plant and not necessarily with regard to original cost or replacement value. On alumina and reduction plants, leasing terms may be offered, if necessary, as favorable as those received by Alcoa under its original lease.

These terms may provide for the RFC to stand losses for an initial period, for the profits to be shared 85 pct to the government and 15 pct to the operator, and in addition for the RFC to review and approve the price at which metal is sold, the top salaries, and extraordinary expenses. In any event, the RFC will require that the operators assume reasonable risks of working capital and that the government withdraw its assumption of other risks after some fair period.

The following general measures will be undertaken to facilitate the success of new aluminum producers, according to the report:

The government stockpile of bauxite at Hurricane Creek will be available to the plant operator. In addition, the board will ask the help of the appropriate federal agencies in exploring the possibilities of securing foreign ore by means of international agreements.

Engineering investigations will be made to determine changes necessary to place plants in the most advantageous position to compete, and the government will finance such changes where the costs appear to be recoverable.

Analysis of Processes For Cutting of Metals Described at Meeting

Cincinnati

• • Recent practical discoveries pertaining to the mechanism of cutting metals were described by two Cincinnati engineers at the American Society of Mechanical Engineers fall sectional meeting here. These discoveries are the result of research in the laboratories of the Cincinnati Milling Machine Co., and were described by Dr. M. Eugene Merchant, physicist and Norman Zlatin, research engineer with that firm.

In the testing of cutting tool materials, materials to be machined, or cutting fluids, or in research or development work on metal cutting processes, the engineer frequently would like to know how the conditions existing at the cutting edge of the tool are affecting results. Such questions arise as the amount of friction between the cutting tool and the shaving which it is removing; in what way the strength of the metal being cut affects the power consumed in a machining operation; how much of the power consumed in this operation is used up in deforming the metal and how much in overcoming the friction between the tool and the shaving.

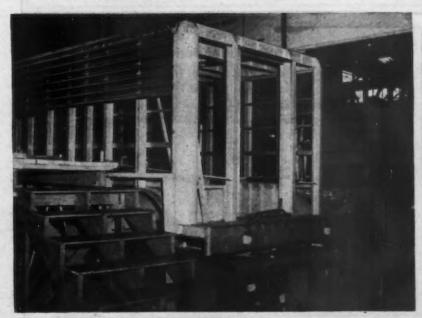
Until recently such questions could not be answered, because the me-

chanism of cutting was not sufficiently understood. As a result, the engineer had to be content to accept the empirical results of his tests without being able to relate them to the physical properties of the materials being tested. However as a result of the research in the Cincinnati laboratory, discoveries which have led to a scientific and engineering analysis of the mechanism of cutting make it possible to obtain quantitative answers to these and other questions.

Dr. Merchant and Mr. Zlatin, in their paper entitled "Nomographs for Analysis of Metal Cutting Processes," described briefly these discoveries and the resulting mathematical analysis of the cutting process. They then presented a series of charts known as "nomographs" (a close relative of the slide rule) which can be used to solve the fairly complex mathematical equations by means of purely mechanical manipulations, thus making it possible for even an inexperienced person to calculate with rapidity the numerical data describing the conditions existing at the cutting edge during "machinability" tests.

Such data, when correlated with the results of the tests, can considerably enhance their practical value to the engineer, it was said, and can be expected to save him much expense and time spent in needless additional testing, in many cases.

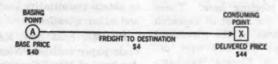
POSTWAR TRAILER—Similar construction methods used in aircraft plants have been applied to the framework of this refrigerated trailer. Airplane metals were used thus cutting the weight of the trailer 51 pct.



THE BASING POINT METHOD

Most steel products are sold on a Delivered Price basis.

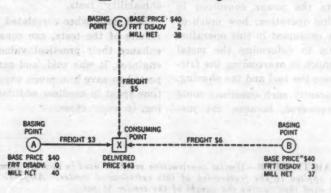
Diagram 1: How the Delivered Price is computed.



THE BASING POINT METHOD

Diagram 2: Explanation of Freight Disadvantage and Freight Absorption.

Mill at (A) has lowest Base Price plus Freight to (X)
Mills at (B) and (C) are at a Freight Disadvantage;
to sell at (X) they must absorb Freight.



THE BASING POINT METHOD

Diagram 3: Explanation of first type of Freight Advantage and so-called "Phantom Freight".

Mill at (A) has lowest Base Price plus Freight to [X].

Mill at (C) charges the same Delivered Price. Having a Freight

Advantage of \$1 over (A), (C) realizes a Mill Net

\$1 higher than (A). This \$1 is so-called "Phantom Freight".



ABC of Basing

By TOM CAMPBELL

New York

• • • Despite the fact that steel companies have made no public announcement of carrying their basing point expansion beyond the stage of stainless steels and although neither the Dept. of Justice or the Federal Trade Commission will make any comment on anticipated additional changes, previous reports in The Iron Age to the effect that changes will be made have been confirmed from reliable quarters.

Because of the interest in the basing point system, diagrams have been reproduced from the U. S. Steel Corp.'s study of the basing point in order to make the functions of this system as clear as possible.

In diagram No. 1 the basic or simple explanation of the basing point method is indicated. Steel is generally sold on a delivered price basis which consists of the base price plus the freight from the nearest basing point. To this is added what is known as extras covering charges for certain sizes, gages, physical characteristics, chemical additions and so forth. In the accompanying diagrams, however, only the base price plus the freight charges are covered.

Diagram No. 2 shows a simple case of three basing point locations competing for a single consuming location. The diagram itself is explanatory but it is an over-simplification of the present method of selling steel.

So-called phantom freight is described in diagram No. 3. In this case the mill location at C is a nonbasing point, but since it is closer to X than A and since its price consists of the basing point price at A plus the freight from A to X, a freight advantage accrues to the mill at C. If, however, the same distances held true in diagram No. 3 and C became a basing point then the freight between C and X would be the factor requiring A and B to absorb \$1 and \$2 respectively. In a simple way this is what is expected to happen in some cases as new basing points are added, but the actual freight charges involved may be somewhat greater than the

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arbitrary ones used in these diagrams.

The use of water for transportation, the freight on which may be less than the rail freight charges from a basing point to a consuming point, is explained in diagram No. 4. In that case A which may be at a freight disadvantage to B, when competing for consuming point X, might if water rates were available offset this disadvantage by using the water rate, because the freight charge is based on the rail rate.

A close scrutiny of diagram No. 5 and an understanding of the method described there forms a simple basis for determining the natural market of a given mill. Reduced to simple terms, generally speaking, when a given mill ships more than half-way the distance between it and its nearest competing basing point, it begins to absorb freight in order to compete pricewise. If the consuming point is closer to A than it is B, A has the advantage and B must absorb and vice versa. If the consuming points should be half-way between A and B, the mill net would be equal.

The further a mill ships beyond the boundary of its natural market territory, the greater is the mill net return reduced, as shown in diagram No. 6. Actual sales in the steel industry, while adhering generally to the scheme described in the diagrams, are often more complex variations of these explanations.

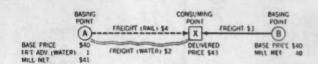
The set of conditions indicated in diagram No. 7 and in diagram No. 8 show what would happen when new basing points are added between those already existent. They indicate in a simple way what happened in 1938 and what is likely in some cases to happen in the near future when additional basing points are named. As shown in diagram No. 7, A and B's natural markets come to an end at the boundary O. As long as A and Bstay on their side of the fence they realize the base price for their product. As soon as they get over into each other's territory, however, they begin to absorb freight. If the nonbasing point mill at C names a basing point, it establishes its own natural market and cuts down the natural

THE BASING POINT METHOD

Diagram 4: Explanation of second type of Freight Advantage and so-called "Phantom Freight"

Mill at B has lowest Base Price plus Rail Freight to X Mill at A charges the same Delivered Price.

When mill at A ships by water it has a Freight Advantage of \$1 and realizes a Mill Net \$1 above its Base Price This \$1 is so-called "Phantom Freight"



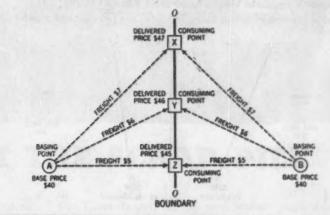
Note: When mill at (A) ships by rail it is at a Freight <u>Disadvantage</u> of \$1 and realizes a Mill Net \$1 <u>below</u> its Base Price

THE BASING POINT METHOD

Diagram 5: Determination of Boundary between Natural Market Territories

The Boundary dividing the Natural Market Territories of mills at

Basing Points (A) and (B) is the line O-O connecting the points at which the delivered prices from (A) and (B) are equal.



THE BASING POINT METHOD

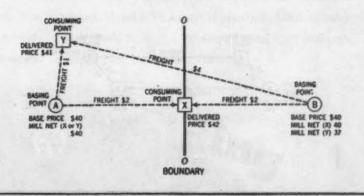
Diagram 6: How shipping beyond Boundary of Natural Market Territory reduces Mill Net.

When mill at B sells to X, its Mill Net is \$40.

When mill at (B) sells to (Y), its Mill Net is only \$37 because

1. Freight is \$2 higher.

2. Delivered Price is \$1 lower.

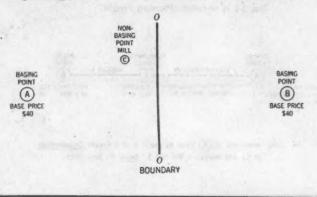


THE BASING POINT METHOD

Diagram 7 Non-basing Point Mill.

Mills at Basing Points (A) and (B) realize full Base Prices on sales in their respective Natural Market Territories.

Non-basing Point mill at © has no Base Price and meets the Delivered Prices of (A) and (B) when it sells in their respective Natural Market Territories.



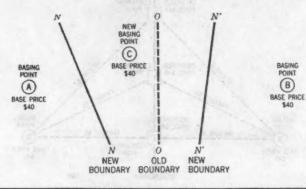
THE BASING POINT METHOD

Diagram 8: Effect of naming new Basing Point.

After © becomes a Basing Point, the Boundary OO between (A) and (B) ceases to be significant.

Mill at \bigcirc then has a Natural Market Territory, bounded by NN and N'N', in which it establishes lower delivered prices than \bigcirc or \bigcirc

To sell in this territory, mills at Basing Points (A) and (B) must now absorb freight.

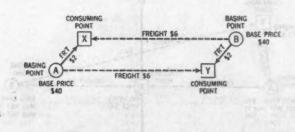


THE BASING POINT METHOD

Diagram 9: Illustration of Cross-hauling.

Products shipped from (A) to Y go past products shipped from (B) to X
This involves Cross-hauling only if

- 1. The products shipped are identical.
- 2. Shipments occur at substantially the same time



Basing Point Definitions

New York

• • • Because of the renewed interest in the basing point system used in the steel industry, the following definitions used in describing this selling practice are presented. Credit for most of these definitions goes to the U. S. Steel Corp., T.N.E.C., The Basing Point Method, Volume 3. Appreciation is also expressed for the use of reproduction of basing point diagrams appearing in this story.

Pittsburgh Plus — Practice used by the steel industry general

Pittsburgh Plus — Practice used by the steel industry generally until the 1920's under which delivered prices were calculated on the basis of the quoted f.o.b. Pittsburgh price plus freight from Pittsburgh to the buyer's destination, regardless of where the steel is produced, often termed a single basing roint system.

Basing Point system.

Basing Point — Usually a place of steel production, although some points, such as Gulf ports and Pacific Coast ports, are named as basing points for products not produced there.

Multiple Basing Points—The naming of more than one location as a basing point for steel products, usually produced at such location.

Freight Absorption—The difference between the freight used by competing mills (which are located at a greater distance than the nearest basing point) in calculating the delivered price and the freight actually paid by such mills.

Mill Net Returns—The

Mill Net Returns — The amount realized at the mill or the delivered price less transportation costs.

Market Penetration — The practice of shipping from other than the nearest mill.

Freight Advantage — When the delivered price will yield a mill net return higher than the base price plus the freight from the nearest basing point. The increased return above the base price plus the freight from the nearest basing point is often called Phantom Freight.

market of A and B, which results in more rapid freight absorption because of smaller individual natural markets.

Diagrams No. 9, 10 and 12 indicate variations from conditions already described. A clear concept of phantom freight and freight absorption in an immediate basing point area is indicated in diagram No. 13. The set of circumstances described



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Breaking a large crankshaft can be a serious matter these days—but Thermit welding can make it much less serious.

Instead of weeks of "down time," while waiting for a new shaft, only 48 hours or less may be required to make the repair with Thermit welding.

Thermit welded repairs are strong and durable strong as a forging of the same cross-section. Machining is seldom required in preparation for welding and subsequent stress-relieving is unnecessary.

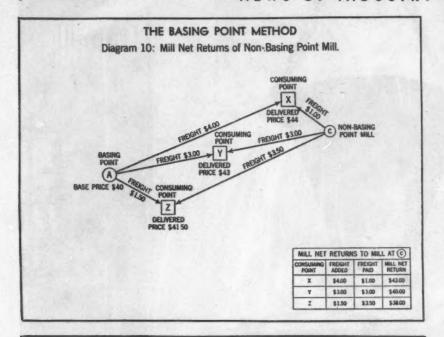
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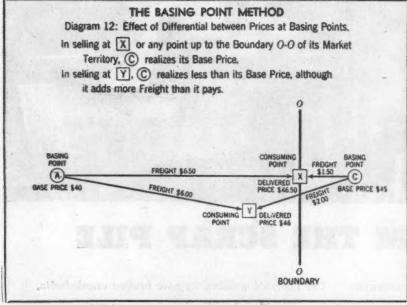
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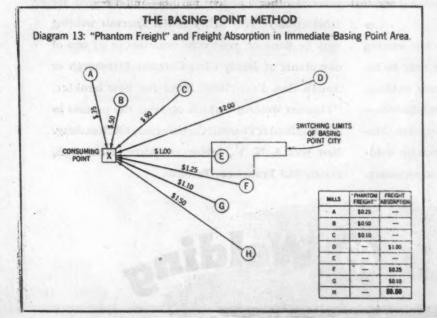
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Use Thermit welding to save broken crankshafts, housings, axles and other heavy parts—and for fabrication of very heavy units. Thermit welding may be done on your own premises or at one of our plants at Jersey City, Chicago, Pittsburgh or South San Francisco. Send for new booklet, "Thermit Welding" which explains the process in detail. Metal & Thermit Corporation, 120 Broadway, New York 5, N. Y., Albany, Chicago, Pittsburgh, South San Francisco, Toronto.

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there usually occurs when the consuming point is close to the switching limits of a basing point city. The freight from the basing point E to X determines whether or not other mills close by have either a freight advantage or a freight disadvantage.

When the steel industry has finished the process of naming basing points at or near most of the locations where its specific products are made, it will come close to having established an f.o.b. mill system, or at least the difference to the customer between the two systems will be of small import. After all the customer, steel companies claim, is interested in the lowest price possible and the industry further claims that the basing point system results in keen competition. It is argued that freight absorption is necessary to utilize steel capacity and to offer customers in distant territories a choice of suppliers.

Regardless of what action steel companies take, however, both the Dept. of Justice and the Federal Trade Commission are expected to closely follow any basic change in the basing price system. Washington's angle on this can be found on p. 94.

Plays Close To His Hip Pocket

New York

• • • John A. Stephens, vicepresident, industrial relations, U. S. Steel Corp. of Del., and chief "bargaining agent" for the corporation in its wage meetings with Philip Murray, USWA head, found it pays to play close to his vest (or hip pocket) while here recently.

Refusing to assume that jostling by another while getting on a bus was the accepted method of getting a seat he looked for his wallet immediately, found it gone and grabbed the fellow in back of him. Sure enough when the pickpocket found that his indignant "Wachamean I took your wallet" did not work, he produced the item with its \$110. Mr. Stephens held the thief for the police, who found that he had a long record for such niceties.

Now John Stephens is facing all kinds of compliments, direct and otherwise, as to his ability to hold on to what he has, and it is even hinted that this same characteristic will of course, follow him when he soon will meet with the steel union, which is asking for a \$2 a day increase.



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Steel Warehouse Statistics Show Distribution of Products During War

New York

• • • For the first time statistics are available on steel warehouse operations in general steel products. During the war period, data were collected by WPB's Steel Division on the activities of steel warehouses, which constitute a vital link in the distribution of steel from the mill to the consumer

A report by the Bureau of the Cen-

sus in the Facts for Industry series 30-8-1 covers steel warehouse shipments, receipts and inventories of general steel products during 1942, 1943 and 1944 and compared with the first quarter of 1941. Detailed statistics have been compiled from reports submitted during the war period by steel warehouses on forms PD-83 and WPB-2888.

The statistics in this report represent, for the United States as a whole, 95 pct or more of the total tonnage of general steel products handled by warehouses. On a regional basis, the coverage was variable, with the southern states showing a slightly lower coverage than the other regions.

The statistics have been calculated by taking the base tonnage of all warehouses reporting in the quarter as a percentage of the total base tonnage of all warehouses. The base tonnage for each warehouse represents shipments from stock during the first quarter of 1941. Coverage is expressed as a percentage of the total tonnage shipped from stock by warehouses during the first quarter of 1941.

Steel warehouses in the Great Lakes Region and the Central States Region shipped 30 and 29 pct, respectively, of all general steel products delivered from warehouse stock during 1944. Atlantic States warehouses accounted for 26 pct of the total, and those in the Pacific States and Southern States for 10 pct and 5 pct, respectively. Regional differences in the type of products handled are seen to be significant when the percentages of each product shipped by different regions are examined. These are shown in the tables.

The only major change in the coverage of the steel warehouse statistics occurred with the reports for the second quarter of 1944. Previous to this quarter all general steel product warehouses were required to submit reports at regular intervals. Beginning April 1, 1944, the smaller warehouses were excused from filing a report on their operations. These

Shipments of Steel Products from Warehouses in 1944

and the second second	REGION							
	Attantic States	Great Lakes	Certral States	Southern States	Pacific States			
PRODUCT	(Percent)							
General Steel Products	26	30	29	5	10			
Carbon	25	30	29	6	10			
Structural shapes, etc. Plates, including skelp. Plates, including skelp. Ralis and track accessories Hot-rolled bars. Cold-finished bars. Tool steel, drill rod Mechar ical tubing. Pressure tubina. Sheets and strip, HR Sheets and strip, CR Sheets and strip, other Tin mill black plate. All other carbon.	27 21 3 28 26 42 23 41 21 30 53 19	26 32 66 22 30 23 35 22 31 34 10 24	27 28 14 28 32 23 31 19 31 34 32 44 6	9 7 11 8 4 4 1 10 3 4 -11	12 12 6 14 8 8 7 2 57			
Alloy, except stainless	25	31	27	2	15			
Stainless	47	12	34	4	7			

Less thar 0.5 pct

Shipments, Receipts, and Inventories of Warehouse Steel Products

Short Tons

		1944		1943			1942		
PRODUCT	Warehouse Shipments from Stock	Receipts into Stock	Inventories as of Dec. 31, 1944	Warehouse Shipments from Stock	Receipts into Stock	Inventories as of Dec. 31, 1943	Warehouse Shipments from Stock	Receipts Into Stock	Inventories as of Dec. 31, 1942
General steel products	4,197,982	4,405,673	1,227,101	3,423,954	3,770,969	1,137,294	2,950,147	2,856,443	744,819
Carbon Steel	4,052,637	4,275,129	1,174,419	3,276,745	3,580,557	1,064,478	2,770,432	2,714,102	717,430
Structural shapes and piling	600,367 743,540 35,470	599,635 858,889 35,652	159,641 212,132 9,458	393,903 584,036 36,337	485,620 620,998 36,362	180,801 130,682 12,064	400,963 476,474 29,439	408,240 462,475 27,291	156,636 102,496 9,547
reinforcing bars) Cold-finished bars. Tool steel and drill rod Mechanical tubing. Pressure tubing	923,783 397,551 15,661 58,118 37,293	884,964 438,631 14,905 62,360 41,310	288,236 139,763 7,942 18,642 12,819	839,894 366,839 19,542 54,108 35,728	992,496 425,155 20,494 50,914 38,580 616,592	347,329 103,992 10,800 16,746 11,079	691,643 289,371 22,991 71,001	674,975 233,660 20,878 69,167	180,363 41,655 9,118 21,650
Sheets and strip, hot-rolled Sheets and strip, cold-reduced Sheets and strip, all other Tin mill black plate. All other carbon steel products.	743,765 404,389 15,444 75,548 1,708	764,809 464,368 20,858 86,627 2,121	164, 867 126, 301 8, 309 25, 057 1, 254	572,903 288,407 13,256 63,598 3,194	616,592 296,222 13,304 54,750 3,080	161,581 70,396 2,775 15,164 1,089	467,586 259,387 18,646 41,359 3,573	475,822 258,440 17,043 61,995 4,116	107,864 58,201 6,006 22,752 1,142
Alloy steel, except stainless steel	121,697	104,182	43,587	131,158	170,778	66,284	155,239	124,983	24,215
Stainless steel	23,648	26,362	9,095	16,053	19,684	6,532	24,478	17,358	3,174

Aids to Better Production



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Machine Tender on Wheels \$23⁵⁰

Built entirely of sheet steel and angle iron, with tubular handles. All welded construction. Overall dimensions: 30" long, 16" wide, 32" high. Top deck 2" deep, lower deck 3" deep. All deck edges turned to climinate roughness. Four 5" x 1" steel wheels, rigid in front, swivel in rear. Finished in standard P.S. gray. Weight approximately 65 lbs.



Slag Cart \$7850

For handling slag, pig iron, hot castings, forgings and other heavy materials. Built of ½" plate with heavy angle iron legs. Tubular handles continue around bottom of frame to form a rocker-shaped bumper at front to facilitate ease of dumping. Reinforcing bar of ½" steel is welded around top edges of all four sides. Two 18" x 3" wheels, roller bearing. Overall dimensions: 35" wide, 67" long, 26" high. Body dimensions: (Top) 29" wide, 43" long, 16" deep; (bottom) 24" x 24". Weight approximately 425 lbs.



Double End Truck

General purpose push truck, with hardwood platform 52" long by 27" wide. End racks are steel, with push handles 36" from floor. Four 6" x 2" metal caster wheels—two swivel, two rigid. Finished in standard P.S. gray.

Item X-114-M (Metal Wheels) \$3750 Item X-114-R (Rubber Tired Wheels) \$4400



A sturdy utility truck for factory or warehouse. Turns in its own radius. Platform built of 1½" hardwood, 48" long, 28" wide, 10" off floor. Reinforced at ends and across middle with bolted-on 1½" hardwood timbers. Four ball-bearing wheels make travel easy. Center wheels are 5" diameter, rigid; end wheels are 5" diameter, swivel. Uprights are of 1½" x 1½" x ½" angles, with 1½" x ½" bar stock welded braces. Handle is 1" pipe. Standard P.S. gray finish. Weight approximately 75 lbs.

Item NS-21-M (Metal Wheels) \$3150 Item NS-21-R (Rubber Tired Wheels) \$3800



Automatic End Dump For Use with Lift Truck

For handling hot metal parts, scrap, stampings, other heavy materials. Rockers geared to the truck. Self-seating, smooth operating. Built of heavy steel plate, reinforced with sturdy angles. All welded construction. Two standard sizes.

tiem \$-878-A Capacity ½ cu. yd. Approximate weight 600 lbs. \$8500

Item S-878-8 Capacity 1 cu. yd. Approximate weight 750 lbs. \$9500

Be sure to give floor clearance your lift truck when ordering.



Wood Box—Tilt Type Metal Bound

General utility push truck. Halfinch tilt for easy wheeling and short turning of corners. Four 5" metal casters—two rigid, two swivel. Two standard sizes.

Item PS-91-A 24" wide, 36" long, 26" high overall, Weight, 185 lbs. \$2950

tem PS-91-E 28" wide 48" long, 30" high overall. Weight 260 lbs. \$3350



Side Dump Trailer Truck \$35000

For hauling metal shavings, light scrap, rubbish, etc. Simple pivot design eliminates need for gears, and allows dumping of load to either side. Locking pin holds body upright for loading and hauling. Capacity approximately 2 cu. yds. Recommended load rating 3 tons. Overall width of 34" enables easy handling through narrow sisles Framework is of structural channel iron. Body, ¼" boiler plate, reinforced at pivot points; top edges angle reinforced. All welded construction. Inside body me nts: 30" wide, 96" long, 36" deep. Pull bar 30" long. Overall meas ments: 9' long (exclusive of pull bar) 34" wide, 56" high. Four 12" x 4" metal wheels, roller bearing, rubber tired. Fifth wheel construction. Weight approximately 1400 lbs. Finished throughout in standard P.S. gray.

Production economy is the purpose behind the P.S. line of materials handling equipment . . . for pick-up, loading, moving, dumping or storage . . . built of metal, or wood, or combination. Tell us your problems . . . our engineers will gladly recommend equipment fitted to your plant and product.

When ordering: Always use "Item" number to prevent error. Send priority to avoid delay. All prices f.o.b. Detroit.

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784 So. Harrington DETROIT 17, MICH.



Combination

Truck and Drain Rack

Loads Automatically

As truck is tilted against drum, steel fingers grip the flange at top. Loading is completed as truck is rocked back to wheeling position. Freerolling wheels make light work of trucking the heaviest drums. Slight downward push on handles lays truck on floor with wheels raised free, thus providing convenient draining position. Heavy angle iron frame, tubular handles, all welded construction. Two 8" roller bearing wheels. Weight approximately 90 lbs.

Detachable Handles. When used as drain or storage rack, handles can be detached. Thus conserving floor space and permitting one pair of handles to serve any number of trucks.

hem NS-506 \$4250 (Handles welded to frame)

(Truck and detachable handles)

Item NS-506-R \$3250 (Item NS-506-DH without handles)

(Detachable handles only)



Book Truck for Curing Rubber

Also serves in the production of plastics and other products. Shelves are made of sheet steel, crimped to provide high rigidity. Long, stiff extension springs assure easy raising and lowering of individual shelves. When raised, shelves automatically stay in tilted position. Heavy casters permit easy moving. Custom built to exactly fit user's product and plant requirements.

Industrial Briefs ...

- FARM MACHINERY Bendix Products Div. of Bendix Aviation has established a sales and engineering group to develop, manufacture and market braking systems to meet requirements of postwar tractors and other farm vehicles and construction machinery, under the direction of Allan C. Chambers and Bryan E. House.
- Moves Headquarters—Martin-Parry Corp. has moved its executive offices from York, Pa., to Detroit.
- OPENS OFFICE Aluminum Alloys Corp., Detroit, has opened an office at 200 N. Division St., Grand Rapids, Mich., in charge of H. Graham Fairchild. The company produces heattreated aluminum alloy castings.
- EMPLOYMENT GOAL—Job opportunities must be provided for 2,100,000 persons, an increase of 360,000 from March, 1940, to provide full employment in the Chicago area, according to William H. Spencer, regional director of the USES. He declares that 110,000 workers were displaced by war contract terminations; 75,000 now are unemployed; and 60 pct of workers released to date have drawn on unemployment compensation insurance.
- ADDS NEW UNIT—Bjorksten Laboratories has established an additional unit at 13791 South Ave. "O," Chicago, which will supplement the company's main office.
- Home Sales Office—Brainard Steel Corp., Warren, Ohio, has established a home district sales office with headquarters at Warren. B. E. Baker has been placed in charge as district sales manager.
- OPENS PLANT—The United Tube Corp. of Ohio has announced the opening of a new plant at 2134 West 53rd St., in Cleveland. Production of mechanical steel and alloy irriga-

tion tubing, in sizes of % in. to 6½ in., is already underway.

- RESEARCH LAB Allegheny Ludlum Steel Corp. has placed first on its peacetime expansion program the immediate erection of an ultra-modern \$2,000,000 research laboratory and experimental center at its headquarters plant, Brackenridge, Pa. The structure is of steel frame and brick design, with double insulating glass windows. The main two-story-and-penthouse building is extended by a onestory furnace section, containing melting and make-up floors, annealing and melting furnaces, and pickling equipment, for experimental work.
- COMING EVENT Machinery Dealers National Assn. has scheduled a convention Oct. 24 and 25 at the Congress Hotel, Chicago.
- INSTITUTE PRESIDENT—Edwin E. McConnell, controller of the Norton Co., has been made president of the Controllers Institute of America to succeed Edwin W. Burbott.
- Acquires Farm Firm—Aviation Corp. has contracted to purchase the controlling interest in New Idea, Inc., manufacturers of farm machinery and implements.
- To Serve Foundries—Westover Engineers, formed to exclusively serve the foundry industry on post controls, occupational and job evaluations and wage incentive problems, has chosen Milwaukee as the location of their office headquarters. C. E. Westover will head the organization.
- WPB SALVAGE TOTALS—Final report of the WPB salvage div., region six, comprising Illinois, Indiana, Iowa and Wisconsin, showed a cumulative collection of 12,808,935 gross tons of scrap iron and steel, which represented 18 pct of the total collected in the nation, it is estimated.

warehouses were selected on the basis of size of tonnage handled.

Atlantic states—Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York (eastern part), Pennsylvania (eastern part), Rhode Island, Vermont.

Southern states—Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, New Mexico, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia.

Pacific states—Arizona, California, Idaho, Oregon, Utah, Washington.

Steel Industry Needs 55,550 More Workers AISI Survey Reveals

New York

• • • The steel industry requires approximately 55,550 additional men to meet anticipated peacetime production schedules, according to a survey by the American Iron & Steel Institute, announced recently.

The men are needed to fill vacancies, to enable operations to return to the 40-hr week scheduled and to meet the expected high level of peacetime operations.

The survey indicated that the steel industry employment was down to approximately 548,000 persons in mid-September, compared with an estimated 552,000 persons in mid-August. In July according to the institute's monthly report of average employment the industry had 557,500 persons on its payrolls, a decline of 4300 from the 561,800 persons employed in June.

The addition of the 55,550 persons needed in iron and steel plants and offices would raise the industry's employment to around 617,000 persons. This total would be well above the average employment of a representative peacetime year like 1937, when the yearly average employment was 572,244. It would be below the peak wartime yearly average of 647,166 persons in 1942.

In mid-August the end of the war with Japan forced steel companies into a short period of adjustment of production schedules during which output of raw steel declined sharply. The industry made a speedy recovery, with a minimum of disruption. In recent weeks operations have climbed back above the 80 pct level.

IN OUR

EXCLUSIVE METAL- Fe Si

CAST PROCESS
U. S. PAT. NO. LIES THE

75%

SECRET OF BETTER FERRO SILICON

Some men are content to do as always has been done. But others set about finding the better way, using contributions of experience and scientific research to drive toward improved products. This spirit of progress led Ohio Ferro-Alloys Corporation to develop a new method of casting Ferro Silicon. Instead of pouring into sand molds, the Ohio Ferro-Alloys Corporation cast Ferro Silicon in clean metal molds.

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UNIFORM PRODUCT

The old sand-cast process delivered with the Ferro Silicon an unpredictable percentage of impurities. Variations in steel are inevitable.

But one variable can be eliminated by use of METAL-CAST FERRO SILICON produced only by Ohio Ferro-Alloys Corporation.

Fe Si Fe Si 85%

Fe Si

90%

Fe Si

Consultatation on problems of iron and steel production is a regular service of Ohio Ferro's experienced staff. End product betterment is foremost in mind.

We invite inquiry.

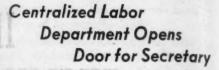
FERRO-SILICON 50%, 75%, 85%, 90%

FERRO-CHROMIUM • FERRO-MANGANESE

BOROSIL • SIMANAL

OFA SILICON, MANGANESE, CHROME





Washington

· · Centralization of scattering labor agencies under the Labor Department, ordered by President Truman on Sept. 18, is a move that long has been urged by industry as a means of more efficient direction of employeremployee relations.

In transferring the National War Labor Board to the Labor Dept., the President's purpose is to clarify a situation which had become increasingly confusing since the Japanese surrender. In the interim, the status of WLB with respect to current labor disputes was uncertain but with centralization of labor activities under Secretary of Labor Schwellenbach the way is once more clear for action by government conciliators.

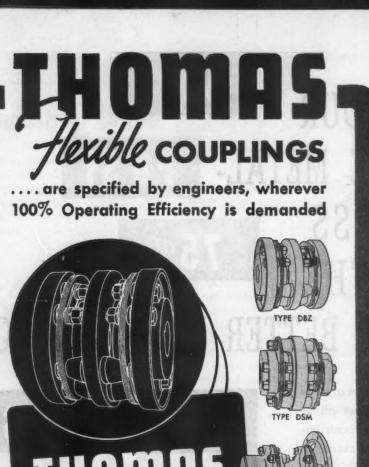
Hovever, Mr. Schwellenbach's reported request that the National Labor Relations Board together with the welfare and security activities of the Federal government be transferred to his jurisdiction, remains to be fulfilled. The NLRB, which was established as a separate administrative body under the Wagner Act, and the National Mediation Board are the only labor agencies retaining their independent status.

Although Mr. Schwellenbach has indicated that he would prefer to leave the National Mediation Board outside of his jurisdiction, there are some who believe that quasi-judicial labor agencies which it typifies should not be subject to reversal or direction by the Secretary of Labor. However, there would be little objection to transferring them to the Labor Department for administrative purposes.

The War Manpower Commission having outlived its wartime usefulness can be readily absorbed by the Labor Department. The facilities of the United States Employment Service which were also transferred to the Department can be utilized to much better advantage than under any other government bureau.

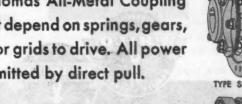
Secretary Schwellenbach, who has promised to "step square in the middle" of the troubled labor situation, now has the necessary tools to go ahead and he has given every indication that no time will be lost in setting the machinery in motion to achieve peaceful labor conditions.

Simultaneously with the realign-(CONTINUED ON PAGE 134)





The Thomas All-Metal Coupling does not depend on springs, gears, rubber or grids to drive. All power is transmitted by direct pull.





HEAVY DUTY FLOATING SHAFT TYPE FLEXIBLE CO

WRITE FOR COMPLETE ENGINEERING CATALOG



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Multiple Welding



DANLY ELD



and Machining

MEANS LOWER FINAL COST

On the battery of Positioners (shown in part upper left) Press Parts are being welded in multiple production-multiple in parts produced, multiple in welds per setting. Positioned welding is flat or down hand weldingfast and productive of sound welds. On a battery of Horizontal Boring Bark (shown in part lower left and above), other parts of the same production order are being machined. These machines are equipped with both horizontal and vertical revolving tables—so that innumerable combinations of boring internal and external milling, reaming, facing and turning are completed at one setup. That means speed in production and low cost. Here are facilities that performed without a break in scheduled production for the U. S. Navy for three years . . . now available to industry for Welding and Machining to Precision Standards in Quantity Production.

We would like to meet with you in your plant or ours or send us your blue prints.



DANLY MACHINE SPECIALTIES, INC. 2100 S. 52nd Ave., Chicago 50, Ill.

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SFEATURES in every Shepard Niles Hoist...whatever the size

- Balanced Drive gearing—all moving parts revolve about a common axis, balancing all stresses.
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- 3 Antifriction bearings.
- 4 Automatic oil-bath lubrication
- 5 Dust and moisture-proof enclosures.
- 6 Motors specially designed for hoist service.
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- **B** High speeds—long lifts.

High efficiency—quiet operation—greatest possible safety and durability.

Consult the Shepard Niles representative in your nearest war-production center or write directly to the home office for information on any load-lifting or moving problem.

Shepard Niles CRANE & HOIST CORPORATION

356 SCHUYLER AVE. . MONTOUR FALLS, N.Y.

(CONTINUED FROM PAGE 130)
ment of the Federal labor agencies,
the President announced the merger
of the Office of Economic Stabilization with the Office of War Mobilization and Reconversion. This move,
although reportedly recommended by
OES Director W. H. Davis some time
ago, came somewhat unexpectedly.

Mr. Davis was quoted as saying at a news conference that the Government had undertaken a program to increase wages 40 to 50 pct without raising prices. Mr. Davis denied making such a statement and a transcript of his remarks bears out his denial. The President declared the Government had no such program, and in a letter of commendation to Mr. Davis said there was no conflict with the true purport of statements which caused misunderstandings.

Light Industries Are Buffalo Need

Buffalo

• • • New light industries were declared the primary need of this area at the second annual meeting of the New York State Chapter, International Assn. of Public Employment Agencies, held at Hotel Statler.

Louis J. Voisinet, president of the Buffalo chapter, in discussing local conditions, said that "while we have heavy steel industries in need of men, a large portion of the unemployed persons are trained only for work in light industries."

As an example of the "type of industry needed here," he mentioned the Westinghouse Electric Corp., which is reported to be interested in the Kenmore plant of the Curtiss-Wright Corp.

National Tube Expands Byproduct Coke Works

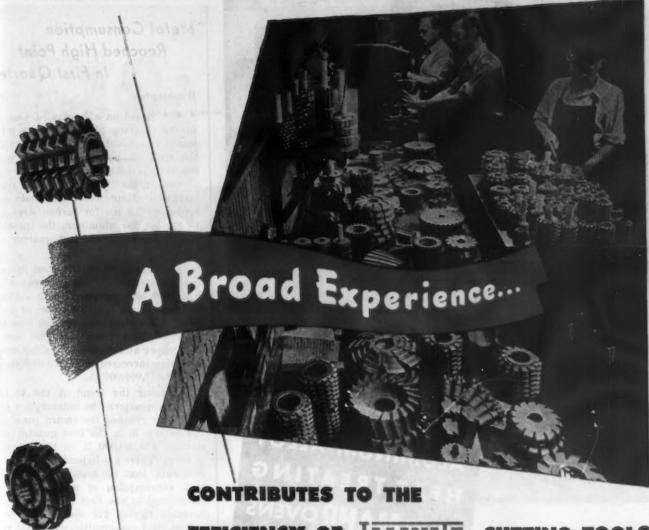
Pittsburgh

TA GINIHDAM QWA

• • • In accordance with U. S. Steel Corp.'s coke rebuilding program, National Tube Co, a subsidiary, has placed a contract for 177 new byproduct coke ovens with the Wilputte Coke Oven Corp., for installation at the Lorain, Ohio, plant.

National Tube's present coke-making facilities at Lorain consist of 208 byproduct ovens, which will continue the production of coke.

There will be three new batteries of 59 byproduct ovens, complete with facilities for recovery of byproducts and with an annual capacity of 850,000 tons of coke. Construction will require from 18 to 22 months.



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The photograph above is a striking indication that Illinois Tool is exceptionally well qualified to be your source for precision metal cutting tools. Thirty-two years of constant application to the design and production of an unusually wide range of types and sizes proves the capabilities of our staff and the completeness of our facilities. Whatever your cutting tool problems may be, you can with confidence turn to an Illinois Tool engineer for a solution that is both practical and efficient.

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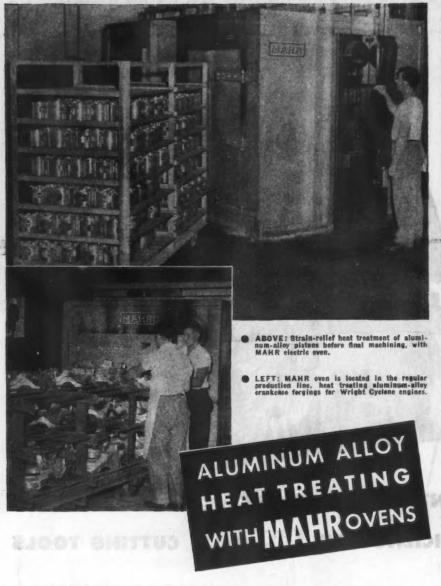
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AT Wright AERONAUTICAL PLANTS

The Wright Plant at Paterson, N. J., has extensive experience with the heat-treating, or the artificial aging of aluminumalloy parts for Wright Cyclone engines on a production line scale. Main illustration above shows aluminum-alloy pis-

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MAHR ELECTRIC BOX TYPE heat treaters for hardening carbon and alloy steels below 2000°F.

OTHER TYPES and sizes of MAHR electric furnaces for annealing, tempering, hardening and stressrelief. tons, 350 to a truck load, ready for a strain-relief treatment in a MAHR forced draft electric oven, where they are held at heat for five hours. For aluminum-alloy crankcase for gings which are treated before final machining, a MAHR electric oven is located in the production line.

MAHR ovens and furnaces are helping manufacturers everywhere turn out superior products at a production pace. They take plenty of punishment, meet exacting requirements, and operate economically.

There's a MAHR engineer-representative near you who will gladly work with you on your heat treating problems. Write, wire or phone us today.



MAHR. MANUFACTURING CO.
DIVISION OF DIAMOND IRON WORKS, INC.

1703 North 2nd St., Minneapolis 11, Minn.

Metal Consumption Reached High Point In First Quarter

Washington

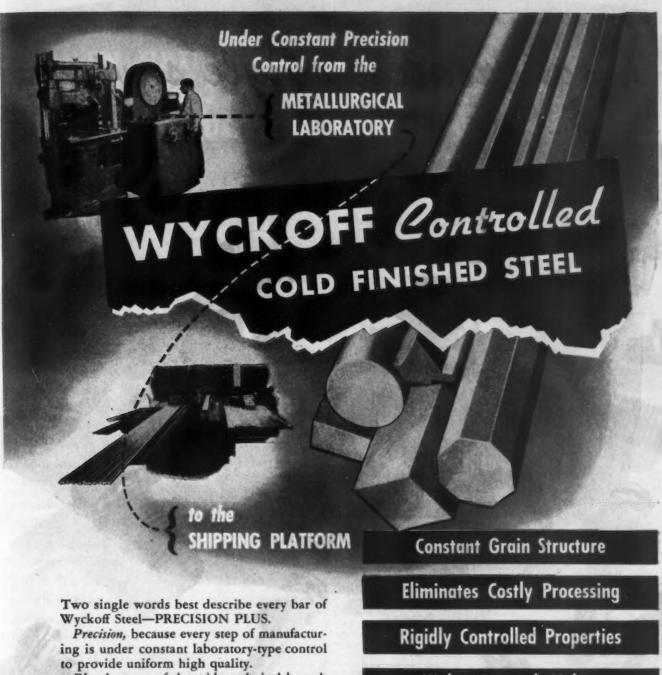
• • • Based on a Bureau of Census survey covering plants that are estimated to account for about 90 pct of the steel, 75 pct of the copper and copper-base alloys, and 85 pct of the aluminum, the 1945 first quarter consumption of controlled materials exceeded by 2.3 pct for carbon steel up to 8.4 pct for aluminum the quantities consumed in the last quarter of 1944.

Consumption of carbon steel in the first quarter of the current year was 9,353,000 tons compared with 9,134,000 tons in the fourth quarter of last year. Alloy steel consumption rose to 1,240,000 tons from 1,169,000 tons, and copper and copper-base alloy consumption increased to 1,421,000,000 lb from 1,317,000,000 lb.

Reversing the trend of the three previous quarters, the consumption of aluminum reached the record peak of 501,000,000 lb in the first quarter as against 459,000,000 lb in the fourth quarter. There are indications, the report said, that the second quarter of 1945 consumption of materials was lower than in the first quarter. Preliminary figures for second quarter carbon steel consumption were said to indicate a decline of about 8 pct.

The largest source of consumption of carbon steel in the first quarter was ship and boat building and repairs, which represented 20.6 pct of the total. Combat tanks, amphibian combat vehicles and parts, except engines, was the greatest consumer of alloy steel, taking 15.4 pct of the quantity used. Artillery ammunition, taking 29.2 pct of the total used, was the heaviest consumer of copper and copper-base alloys. Airplanes, gliders and parts took the greatest amount of aluminum, consuming 46.1 pct of the total.

With the exception of copper and copper-base alloys, usable inventories at the end of the first quarter were lower than at the beginning of the quarter. The carbon steel inventories on last Mar. 31 declined to 6,483,000 tons from 7,069,000 tons on last Dec. 30; alloy steel inventories dropped to 749,000 tons from 775,000 tons and aluminum inventories declined to 271,000,000 lb from 285,000,000 lb. Copper and copper-base alloy inventories increased to 585,000,000 lb from 573,000,000 lb.



Plus, because of the wide technical knowledge and top "steelmaker's" skill found in the entire Wyckoff organization.

Wyckoff engineers will be glad to apply these *Precision-Plus* qualities to your post war production problems. Higher Strength Values

Maximum Machinability—Always

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Your greatest single saving



.....IN USING LAMSON LOCKWASHER SCREWS.. IS TIME.. AND SAVING TIME SPEEDS PRODUCTION, SHIPMENTS, SALES

You save time in not having to match lockwashers to screws, more time in not having to place lockwashers on screws, and still more time in not having to inventory and handle separate stocks of lockwashers and screws. This time-saving feature is one you cannot escape enjoying. You simply order the proper size screw you want, the type and size lockwasher you need, and then you get them together, as a unit. And of course you apply them as a unit—manually or with automatic hopper-feed screw drivers. And in dis-assembly as in assembly, this time-saving, temper-saving feature works for you all the time. You simply cannot lose the time-saving feature this fastening insures by its use.

Time-studies are not needed to demonstrate that reaching for a screw and reaching for a lock-washer separately takes more time than reaching for both at once when joined inseparably together. It's just good business to use them where possible because of the time-saving bonus you get on your assembly costs. And incidentally their cost is little or no greater than if lockwasher and screw are purchased separately!

Until now most of Lamson's lockwasher screws were going into war material, for saving time was one of the most effective weapons we had and saving time in making repairs, adjustments and replacements contributed to faster movement of supplies to fighting fronts. More than ever before, this time-saving feature will be important to you in your future production.

A new folder is ready for you providing complete information, lists and stock sizes of Lamson lockwasher screws. Ask for it with the convenient coupon below. Samples will be sent on request.

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Plants at Cleveland and Kent, Ohio; Chicago and Birmingham



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"BOLTS ARE IMPORTANT!"—24-page booklet of currently useful information for buyers of headed and threaded products, and describing Lamson & Sessions' specialty fastenings which have wide industrial applications —now, and in the post-war period. Sent gratis.

"THE LAMSON BLUE BOOK"—is our standard Catalog of standard products excepting our Aircraft products. 3ent gratis.

"SIMPLIFIED STOCK LIST"—Of bolts, nuts and screws, conforming to latest revisions of the Office of Price Administration, and of great value in showing you in what ratio quantities of various standard products are kept in stock for deliveries, by your jobbers and in our own (and other bolt manufacturers') warehouse stocks. Sent gratis.

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Sen	d info	rm	ation on	Cap Se	crews	and S	et Sci	rews			Cottes

Send information on Cap Screws and Set Screws Cotters
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with EULLID Granes

Yes, cranes and hoists by EUCLID have an enviable reputation for "making light of heavy work" because they have been doing just that for many years in prominent industrial plants around the nation . . . day after day, year in—year out, frequently on 24 hour schedule.

High grade, wide face coarse pitch gearing is used throughout. Shafts are strong to withstand torsional stresses. Anti-friction bearings assure longer life and lower power consumption. Every part has a liberal factor of safety.

EUCLID CRANES of standardized design, with all parts jig-machined to assure interchangeability, are built in capacities from 3 to 25 tons with spans from 20 to 100 feet. Larger and heavier cranes of greater capacity are built on special order.

Enlist the aid of EUCLIDS now and "make light" of your material handling problems.

THE EUCLID CRANE & HOIST CO. 1361 CHARDON RD., EUCLID, OHIO



Direction 11 to PR 1 Promulgated by WPB

Washington

· · A producer of steel, copper or aluminum in specified forms does not have to accept a rated order, except one rated AAA, which is received less than 30 days prior to the first day of the month in which shipment is requested, WPB has ruled.

The ruling was contained in Direction 11 to Priorities Regulation 1, which supersedes those provisions of PR 1 which are contradictory to the direction. All other rules in PR 1 continue to apply, WPB said.

Direction 11 also provides that a rated order for steel, copper, or aluminum in the listed forms must specify delivery on a particular date or a particular month, which in no case may be earlier than required by the person placing the order. A producer must schedule the order for delivery within the requested month as close to the requested delivery date as is practicable in view of the need for maximum production.

The direction applies to the following forms of steel, copper and aluminum:

Carbon and alloy iron and steel (including stainless steel)

Bars, cold finished
Bars, hot rolled or forged
Ingot, billets, blooms, slabs, die blocks,
tube rounds, sheet and tin bar, and skelp Pipe, including threaded couplings of the type normally supplied on threaded pipe

by pipe mills

Plates Rail and track accessories

Sheet and strip

Casting (rough as cast) Structural shapes and piling

Tinplate, terneplate and tin mill black

Tubing

Wheels, tires and axles

Wire rods, wire and wire products Forgings (rough as forged)

Copper and copper base alloy products

Alloy sheet, strip and plate Alloy rods, bars and wire Alloy seamless tube and pipe

Plate, sheet and strip

Tube and pipe Wire and cable

Castings (before machining)

Aluminum Products

Rod and bar Wire (under %") Cable (electrical transmission only)

Forgings and pressing (before machining)

Castings

Rolled structural shapes (angles, channels,

zees, tees, etc.) Extruded shapes

Sheet strip and plate

Slugs

Foil

Tubing

Powder (including atonized, granular, flake

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Plan now to use these

The following production services of the Barium Steel Shops are now available for contract work in melting and refining, forging, heat-treating and machining. We welcome particularly work of a difficult nature on which our modern facilities, skilled personnel and Unified Control can produce unusually satisfactory results.

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We now have available 1500ton and 1000-ton forging presses for heavier requirements, and steam forging hammers of up to 12,000 pound capacities for flat die work.

Melting Facilities consist of several open hearth furnaces up to 35 tons in size - now melting and meeting all analyses of carbon and a range of alloy steels to the critical specifications of both the United States Government and the aircraft industry. We can cast ingot sizes up to 42" diameter and 40,000 lbs. in weight.

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Annealing furnaces of the most modern type are included in our plant, as well as

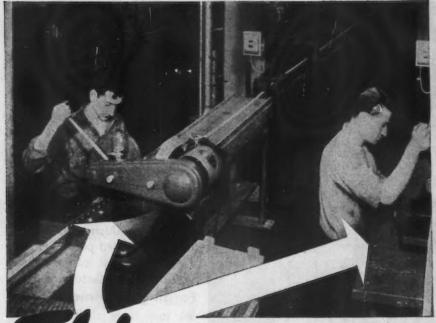
Machining Facilities and a well equipped

Chemical and Metallurgical Laboratory

. This Unified Control is available to you in whole or in part. We welcome your inquiries.

Producers of Carbon, Alloy and Stainless Steels

CANTON -OHIO



production-line operation simplified . . .

by utilizing a standard Delta tool

• The above illustration shows how R. D. Werner Co., Inc., New York, N. Y., uses a standard Delta-Milwaukee Machine Tool, to get an efficient sequence of operations in the dry extrusion process of making thermal plastics for decorative and structural shapes.

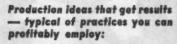
A compact Delta-Milwaukee Cut-Off Machine supplements the production line, so that the continuous strip material can be cut to proper lengths as it comes from the forming machine.

This is representative of the ways in which hundreds of plants have employed Delta's modern, flexible approach to tooling — on a wide variety of operations.

Low-cost Delta-Milwaukee Machine Tools and the ingenuity of your engineers provide a working combination that results in practical, economical solutions to many production problems. Delta's savings in cost, weight, and space are not made at the expense of quality, but are due to advanced design and modern production methods applied to a large volume of standard models.

Perhaps a study of the versatility of Delta-Milwaukee Machine Tools may suggest ways of cutting your investment risk in retooling.

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- 1. Use standard, low-cost Delta components to build high-production, specialpurpose machines — quickly convertible to other uses when requirements change,
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MA-24

Prices on Gray Iron Castings Upped 10 Pct

Washington

• • • Effective Sept. 17, OPA announced an increase of 10 pct in manufacturers "base period" ceiling prices for gray iron castings. Ceiling prices for most gray iron castings originally were established as the highest prices charged between Aug. 1, 1941, and Feb. 1, 1942. Subsequently, producers were permitted to calculate ceilings for other iron castings, including those produced by others in the base period, on a "formula" basis using labor, materials, and other costs in computing these ceilings.

OPA said that the increased prices had been authorized because a disparity has developed between the "base period" and "formula" calculated ceiling prices, and to encourage production of "base period" work by the original producer rather than have the pattern moved to new shops operating at "formula" prices. Today, OPA added, the "base period" ceiling prices do not reflect increases in production costs since 1941.

Says Germany Lacked A-Bomb Organization

Chicago

• • • Germany's failure to produce an atomic bomb was not entirely due to lack of technical knowledge but principally to incapability of marshaling a massive industrial effort to produce needed ingredients, Dr. A. Allan Bates, manager, chemical and metallurgical research, Westinghouse Electric Corp., told the Chicago chapter, American Society for Metals, here recently.

Germany failed to organize its scientific brains for concerted war research until 1944, he said, and by then it was too late. Harrassed by rapidly dwindling supplies of alloying elements, German designers attempted to make up for this lack by ingenious design with varying success. Their progress in metallurgical research approximately paralleled ours. The enemy admired and imitated our NE steels, he said. Dr. Bates described before the society his experiences as a metallurgist in South America and in Europe during the war years.

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The Kennamill "Universal" Face Mill can be used for milling different materials, at high rates of metal removal, simply by interchanging blades having the right grade of Kennametal and proper cutting angles. Advanceable, solid Kennametal blades are wedged into the sturdy steel body at fixed angles, after having been ground on the edge to provide an effective cutting angle negative radial rake for steel; positive radial rake for cast-iron and non-ferrous materials.

All design features of this cutter contribute to the possibility of removing a large volume of metal between regrinds. Radially set blades, rigidly supported, maintain their edge longer; and, because the blades are wedged-in instead of brazed-on, brazing strains are eliminated, either initially or during grinding. Hogging cuts, up to a depth of 'h'', are entirely feasible. Ample chip accommodation is provided for all depths of cuts.

The solid Kennametal blades can be reground on a surface grinder, as described at the left, thus eliminating need for special cutter grinders, and greatly reducing off-the-job-time required for reconditioning cutters having brazed in tips. Blades can be resharpened many times, then used in smaller "Universal" Cutters.

The Kennamill "Universal" Face Mill is available in four sizes—4", 6", 8", and 10". Prices and particulars are yours for the asking.



KENNAMETAL Suc., LATROBE. PA.

BLADES ARE ON SURFACE GRINDER

Russian Rebuilding To See Modernized Production Units

New York

mines in the south of that country will permit the rebuilding with high economy, high output units to replace obsolescent equipment found there before the war. According to the British journal Iron and Coal Trades Review statistics showing amortization of new plants from savings in production costs in five to 12 years are dictating the modernization of almost everything that is being rebuilt.

Quoting the Soviet economist Mr. V. V. Rikman, the British publication states that the newly-built plants will be less difficult to rebuild, but even here advantage must be taken of the opportunity of modernizing some equipment and processes.

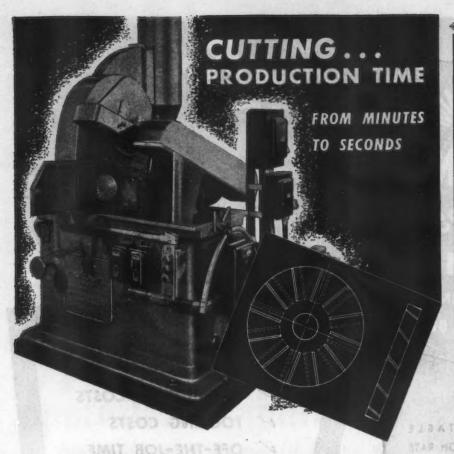
In these circumstances the Institute of Metallurgy of the Academy of Sciences, which includes such metallurgists as A. A. Baikov, I. P. Bardin, E. V. Britske, N. T. Gudtsov, and M. A. Pavlov, completely reorganized its plan for 1943 and 1944, in accordance with directions given by V. Komarov, pres. of the Academy.

The Academy of Sciences does not plan to replace the engineers and other specialists of the People's Commissariat of the Iron and Steel Industry, but will work out the main lines of technical policy to be followed; the Academy will, as far as possible, strive to apply this policy to individual mills.

The idea of standardization runs through all the Institute's work; reconstruction offers opportunities for the manufacture of such equipment as ladles, ingot molds, pig breakers, etc., in accordance with standard designs. Buildings and the general planning of the mills may also be standardized.

Apart from insuring that the newly-built mills do not exceed a capacity that can be supplied from available raw material sources, great stress is laid on the selection of standard blast furnaces of specified working capacity. If this plan is carried through in its entirety the quantity of iron smelted will be almost doubled and the number of blast furnaces reduced by 10 to 15 pct. Pre-war experience in replacing old, worn furnaces by new, mechanized furnaces reduced the amount of labor expended on

(CONTINUED ON PAGE 148)



PROBLEM: To cut angular slots in a disc 8" in diameter, approximately $1\frac{1}{4}$ " thick, going in from the periphery (see sketch). The material was heat-resisting stainless steel. The way the manufacturer was doing this job required a larger battery of machines to meet production requirements and it would take minutes to make each cut.

ABRASIVE CUTTING MACHINE was rearranged to receive an automatic indexing fixture which compensates for wheel wear and depth of cut. The time required for cutting each slot (approx. 2 sq. in.) is 15 seconds. One operator can run all machines required for full production schedule.

Unusual? Yes. We are constantly adapting CAMPBELL ABRASIVE CUTTING MACHINES to do unusual jobs—or to do ordinary jobs faster, better or at lower cost. Perhaps we could solve a cutting problem for you. We'll be glad to talk it over.

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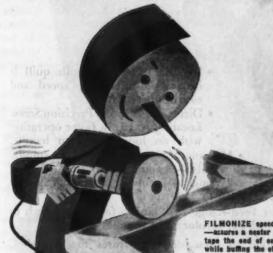
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speeds from 50 to 2500 rpm.

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In addition to these design features the Model C Milwaukee Autometric is unusually simple in operation; even an unskilled operator will quickly become familiar with this machine. An added feature is its cleanliness in operation — chip disposal being provided through the base of the machine.

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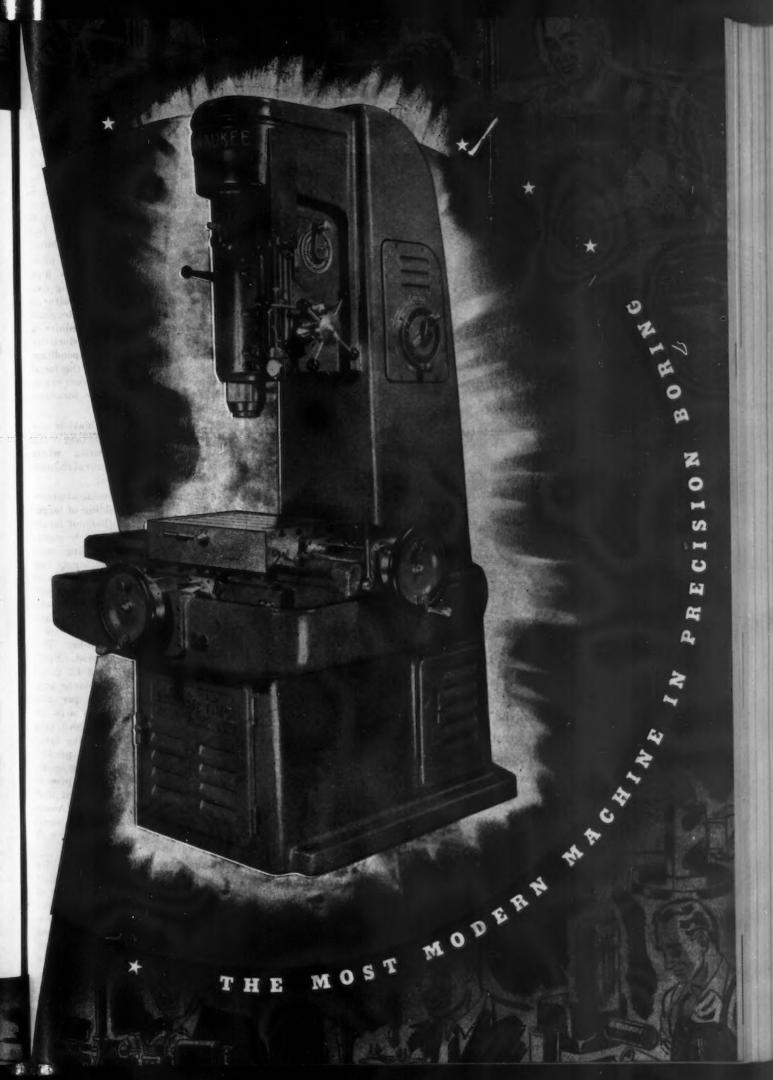
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Conveyors offer by far the most practical and economical method of handling coils to and from the numerous processes in the mill. In many instances, conveyors greatly facilitate the feeding of material into processing equipment, and in some cases, the conveyor is an integral part of the process itself. Coils are handled on end, or on side as conditions require. The multiple Down-tilter shown here handling up to three coils at a time, is typical of the many types of Logan automatic equipment used to eliminate waste motion, rehandling and other material movement wastes. Send for Catalog No. 22 which is full of helpful information on steel mill conveyor setups.

Logan Co., Inc., 545 Cabel Street, Louisville 6, Kentucky

Logan Conveyors

(CONTINUED FROM PAGE 144)

1 ton of iron to one-fifth of its former level. Some details of work planned for the future are of interest. Specialists are of the opinion that a special iron works should be built somewhere in the Donets Basin (or an existing mill converted) for the production of iron amalgams by oxygen blast. This will limit the production of oxygen, for some years, to one factory working with Kapitsa's machines.

Desulfurising is an important problem in the Donets Basin; the high sulfur content of Donets coking coal justifies the proposal to desulfurise outside the blast furnace. Reagents are being sought which require a minimum of soda. The productivity of the blast furnaces, the expenditure of coke and the quality of the metal produced will depend to a great extent of the effectiveness of the measures adopted.

Air conditioning of the blast is also an innovation that is important in the southern parts of Russia where humidity may undergo several changes in the course of 24 hrs.

In the steel shops special attention is being paid to the building of larger open-hearth furnaces (but not larger than 180 to 200 tons), and to equipping the plant with blooming mills capable of handling huge ingots cast from these furnaces. In such mills all processes from beginning to end will be mechanized. Pre-war experience shows that 1 ton of steel in fully mechanized shops required the expenditure of 1.6 to 2.0 man-hr. This figure has since been lowered. Semimechanized plants required 4.3 to 6.0 man-hr, and the oldest plants anything up to 11.5 man-hr per ton. The casting of large ingots with the introduction of sheet, rail and tube rolling equipment for handling large ingots will greatly increase productivity. Engineers are working on designs for such mills at the present time. It is a point of interest that Soviet metallurgists call these "American" mills as opposed to the semimechanized "European" mills, with their lower productivity.

Among other proposals made for the steel mills are electrification of all rolling mills, the centralization of special, non-standard mills in order to decrease the number of them in use, the development of cold rolling, and the improvement of mills during their reconstruction in accordance with the latest technical developments.

Among the more complex problems to be dealt with is the use of Kerch ore. The problem is to employ the





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large amount of phosphorus and vanadium in this ore and at the same time produce high quality steel with a normal output for the given equipment. The main lines for the solution of this problem have already been laid down, and the Academy of Sciences expects to have the details ready this year.

Other complex problems are: (1) The introduction of the whole cycle of production from ore to rolled steel in those plants which formerly worked with iron smelted elsewhere; and (2) improvements in the design and location of the various departments of the works.

In conclusion it must be mentioned that the Institute of Metallurgy is only concerned with the main processes (iron smelting, steel smelting and steel rolling), and that problems connected with the reconstruction of power units, transport system, etc., are the work of other institutes.

OPA Announces Price Boost on Some Items

Washington

• • • Increased prices of 8 pct in manufacturers' ceiling prices for drop forgings, metal stampings and screw machine products, effective Sept. 19, OPA announced, are applicable to all sales and deliveries made since Sept. 5 when open billing for manufacturers of these products was authorized.

The pricing agency said that the increases were in line with the reconversion policy to adjust prices to reflect increased direct material costs and labor rates. The higher prices were provided through issuance of an increase factor of 8 pct which the affected manufacturers may use in computing their ceiling prices under the OPA reconversion pricing program.

The manufacturer of drop forgings, to calculate his ceiling price for one of his products, takes Oct. 1, 1941, price for the item and multiplies it by the increase factor of 8 pct. The sum of the resulting figure and Oct. 1, 1941, price is his reconversion ceiling price.

The manufacturer of metal stampings and screw machine products calculates his reconversion price the same way, except that his base price used in making the computation is his price for the item on the base date of Mar. 31, 1942.





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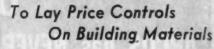
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Washington

• • • Lifting of building controls through relaxation of Order L-41 effective Oct. 15 has made Office of War Mobilization and Reconversion officials jittery over the prospects of an inflationary spiral.

This action which marked a conclusive victory over OPA was spearheaded by WPB chief of staff J. D. Small in the face of what first appeared to be overwhelming opposition.

OWMR, however, is pursuing a middle-of-the-road course with respect to residential and industrial construction and, at the same time, initiating anti-inflationary moves.

The six-point program announced Sept. 18 is designed to increase production of needed building materials but simultaneously provides for tightened inventory controls intended to prevent hoarding. Meanwhile, OPA is charged with the responsibility of strengthening price controls over building materials. This represents complete abandonment of Administrator Chester Bowles's plan to formulate and enforce price ceilings on individual housing units. The individual ceiling program would be confronted with almost insuperable administrative difficulties. Widely divergent costs between different sections of the country and between contractors in the same locality is but one example of the problems confronting such a

There are, however, other obstacles to be overcome if the construction program is to be put into high gear. Localized shortages of pipe and wiring may prove to be a handicap. Electrical fixtures are reportedly short in many localities and will be in ample supply only after distribution problems are worked out.

Lumber is "green." Seasoned lumber is almost unobtainable. Union restrictions also appear to be an impediment to the construction program. In many cases low-priced materials cannot be used. Construction short cuts such as use of prefabricated sections is forbidden by the union and the lack of apprentices will contribute to localized labor shortages.

Government estimates that around 400,000 housing units will be constructed within the next year indicate that the anticipated annual demand for 1,250,000 dwellings over the next ten years will be far from satisfied.



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alternate 52-C-18	Compound, Exterior Surface Corrosion Preventive Compound, Rust Preventive, Thin-Film (polar type)	Tectyl 481
32-0-10	GRADE I GRADE II GRADE III	Tectyl 506 Tectyl 502 Tectyl 511

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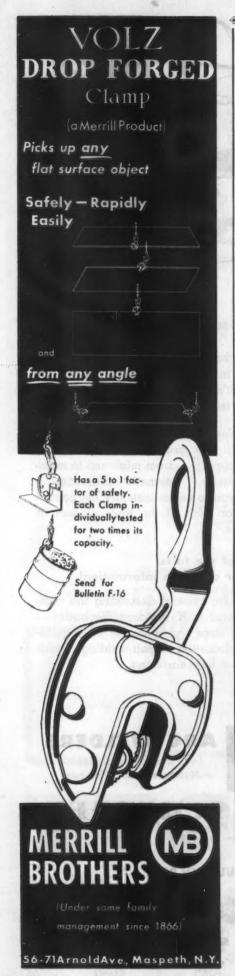




WELDING PRODUCTION CONTROL SYSTEMS







Low-Temperature Behavior of Ferritic Steels

(CONTINUED FROM PAGE 71)

grain existing under the conditions of heat treatment, not the McQuaid-Ehn grain size, for the McQuaid-Ehn test is carried out at 1700°F, at which temperature many steels coarsen that do not coarsen at their proper temperatures of heating for normalizing or quenching, and steels returned fine grained at 1700°F may be coarsened by heating sufficiently higher. There is some indication that even though not actually coarsened a steel heated close to its coarsening temperature may show impaired notched-bar behavior, hence coarsening tendency as well as grain size demands evaluation.

Fine-grained ferritic steels usually show very much improved low-temperature notched-bar behavior in comparison with similar, but coarsegrained steels. Annealing compared to normalizing: the as-rolled condition compared to the normalized condition; over-heating prior to quenching or normalizing; that is, anything leading to a coarse austenitic grain is detrimental. Untempered martensite is, of course, brittle at any temperature, while the toughness of structures resulting from the tempering of martensite depends largely on the grain size or degree of agglomeration of carbide in the tempered structure.

Finely emulsified sorbite behaves better at low temperatures than coarser sorbite. Softening a quenched structure so that a weak steel, but on with very high room-temperature notched-bar results, is obtained may lead to very low notched-bar results at much lower temperatures, whereas a stronger, less softened structure may show high results. But a very hard steel always tends to be brittle, so there is some optimum degree of tempering. The response of different steels and different heats to different degrees of sorbitic tempering may be quite different. Different steels show different optima of tempering; maximum toughness, as appraised by other than low-temperature notched-bar tests, is no assurance of high values at low temperature.

The finer the pearlitic structure obained at the faster cooling rates in normalizing, the better the low-temperature behavior, but if the cooling rate is so far depressed that bainite rather than pearlite is produced, poor low-temperature behavior may result. There are few, if any, exceptions to



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100 Seminary Ave., Dayton 3, Ohio

STRENES

FEATURE CONTINUATION-

this generalization in as-rolled or normalized steels, but in quenched and tempered steels, exceptions occur, leading to the conclusion that grain size per se is not the only criterion.

Carbon Content

The carbon content of a ferritic steel in the as-rolled or normalized condition markedly affects the notched bar values at room temperature as shown by the conventional specimen. With a low room-temperature value in the high-carbon steels and a fracture already approaching the brittle type, the low-temperature change is relatively small compared to the shift in values above and below the transition temperature range in softer steels. A medium-carbon steel quenched and tempered to about 50 Rc or more likewise shows low room temperature values and still lower ones at subnormal temperatures. However, no steel studied in this work has failed to show measurable energy absorption even at -310°F, even if the fracture is of the brittle type.

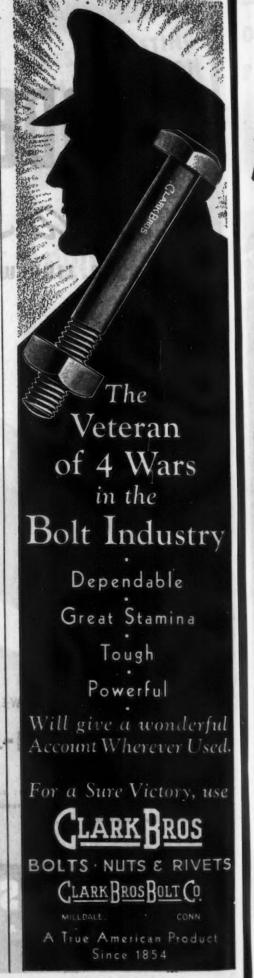
Some fine-grained fully hardenable steels, quenched and tempered to troostosorbite or fine sorbite, return values of energy absorption of 15 to 20 ft-lb, round notch and tough type fractures at —310°F together with high static strength.

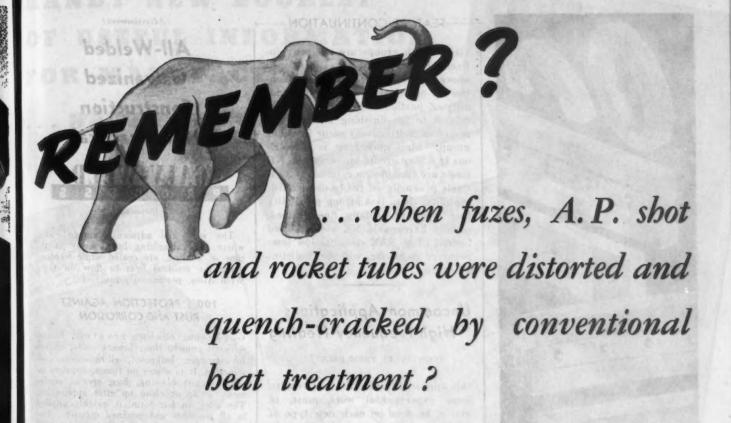
Steels and treatments returning high values at —175°F are somewhat more plentiful, and a good many give high values at —110°F, but actual test for each heat of steel and each treatment is required. There is a considerable degree of individuality among different lots at this temperature range.

When quenching and tempering cannot be applied, very low carbon, fine-grained steels with generous amounts of ferrite-strengtheners, such as nickel, are usually advocated for use at very low temperatures, the low static strength being accepted in order to obtain high notched-bar toughness.

While the nonquenched steels are sensitive to carbon content, in the quenched and tempered steels of medium carbon content, the carbon level is not so critical. Lower carbon, high alloy steels and higher carbon low alloy steels if of equal grain size and hardenability behave much alike. Nevertheless even in such steels, those of higher carbon content show a general tendency toward less tough behavior.

The NE steels as a class are as likely to give good low temperature toughness as are the SAE steels as a





The "interrupted" salt quench which solved it can well be used for today's jobs, too!

Call it martempering, austempering, or modifications of either — Houghton's Mar-Temp Salt provides the answer to distortion and residual strains set up by too severe a quench.

The "interrupted" quench has its definite place in processing of metals for consumer goods. It can be mechanized in modern salt bath furnaces. The Houghton salt developed for it is pure, stable, fluid,

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easily removed from the work, and possesses a rapid quenching speed through the critical zone.

For heating to austenitizing temperature and for quenching the safe, modern way, use Houghton's Liquid Salt Baths. Ask the Houghton Man, or write E. F. HOUGHTON & CO., 303 W. Lehigh Ave., Philadelphia 33, Pa. and all principal cities in the U. S. and Canada.

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for metal working

All-Welded Galvanized Construction **Now Practical**

GALV-WELD

The weld and adjacent damaged area, where the galvanizing burns away at the time of welding, are coated while welding, using the residual heat to flow on Galv-Weld Alloy, permanently insuring

100% PROTECTION AGAINST **RUST AND CORROSION**

Galv-Welding obsoletes riveted, bolted, soldered construction; lowers costs; makes for stronger, leakproof, vibrationless con-struction. It produces no fumes, requires no sand or grit blasting, flux, special equipment, set-up or clean up after application. The alloy, in bar form, is quickly applied in all positions and confined quarters. The coating eliminates painting expense: will not chip, peel or crack, even when the base metal is stressed beyond its elastic limit. Fractures in galvanizing, due to forming, are easily coated.

Government approved, with tests showing Galv-Weld equal to and/or better than hot dip galvanizing in corrosion resistance, not only passing standard salt spray requirements of 200 hours, about 8 days, but remaining in test 141 days. Galv-Welded joints have withstood over 8 years' exposure to salt air mists. The process is a must for under-ground storage tanks. All-welded steel buildings are now practical.

RAILROADS employ it in construction and repair of water tanks, signaling systems, towers and piping.

SHEET METAL WORKERS use it in air conditioning duct systems. It is also especially applicable in refrigerator units.

REFINERIES like it because it is not affected by the corrosive acid-bearing fumes.

ELECTRIC POWER COMPANIES are redesigning transmission towers to utilize welded rather than bolted type construction. It is used also in the repair of sub-station galvanizing and transformer cases.

SHIPBUILDERS are coating welded seams and joints in pipe, sheets, plates, ventilation ducts, deck houses, water and fuel tanks, sanitary drains, ammunition and ready-service boxes, gallery and baking equipment, sinks and washers, cold storage lockers, inner bottoms and hand rails.

You are invited without cost to submit products for producing examples of Galv-Welding. Further details and sample of Welding. Galv-Weld Alloy may be had by writing

GALV-WELD PRODUCTS

Dayton 10, Ohio

class. Both groups are similarly influenced by the factors mentioned above. Both require grain size control for optimum results and individuality of particular heats, presumably related to the finishing practice employed in melting, may occur in either group: Slack-quenching is deleterious in either group, but since the NE steels are classified in relation to SAE steels primarily on the basis of hardenability, there is a strong possibility that when an equally fine grained, equally hardenable NE steel is used instead of an SAE steel, its low temperature behavior will be indistinguishable. Uncommon Applications High-Frequency Heating

(CONTINUED FROM PAGE 73)

vals appeared to give the best results. Some experimental work must, of course, be done on each new type of mold to establish the optimum cycle times, but the time savings effected may be judged by the fact that before induction heating was adopted 11/4 to 11/2 hr was required to melt the pattern illustrated.

Still another example of induction heating involves the fusing of thorium oxide, a chemically pure, white precipitate obtained originally from China, and used in the manufacture of gas mantles, high-temperature tubes, and beakers. The temperature required for this operation was 5000° F, and the method developed involves the use of a special six-turn coil of 3-in. inside diam, bedded in a 6-in. hard glass container together with a carbon crucible 2 in. in diam and 3 in. high containing the oxide to be fused. The space between the outside of the crucible and the walls of the outer container was also filled with thorium oxide packed around the coils to serve as a heat insulator. Its insulating value when used in this manner is very high. A 2-oz load of oxide within the crucible was fused in 14 min. The only known alternative is electric arc fusing of very small quantities, which is a relatively tedious and uncertain method, and is believed to be wasteful of thorium.

The examples given here are but a few of the many problems solved, but they serve to show the wide variety of parts to which relatively inexpensive induction heating may be applied. When the equipment is not in use there is no operating expense, and







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CONTINENTAL

PRODUCERS OF STEEL SHEETS, including SUPERIOR Galvanized, COPPERIOR (copper-steel Galvanized, SUPERIOR Galvannealed,

CHECKERCOAT Galvanized, Hot Rolled Annealed, Hot Rolled Pickled, Long Terne, and many styles of Galvanized Formed Roofing. ALSO, Manufacturer's Wire in many sizes, shapes, tempers and finishes, Continental Chain Link Fence, Nails, and other steel products.

when it is needed there is no delay such as is required for bringing an oven up to temperature. Coils can be made up to suit every conceivable shape of part, and are so inexpensive that they may be made for heating even a single part or held in stock for occasional use. Conversely, the same coil may be used for years on thousands of parts, since there is no physical wear involved.

Dimensional Control To Millionths

(CONTINUED FROM PAGE 81)

for operation of the measuring equipment in a matter of hours for any of the precise dimensions in these critical elements of the product.

Fig. 1 shows the Precisionaire base instrument mounted on the head of an internal grinder. It indicates hole size to the operator who is inserting the gaging spindle in the hole being ground. Normally, three or four checks are all that are necessary during the grinding operation for the operator to bring the part diameter to finish dimensions.

Two of the many rows of internal grinders, each machine equipped with a Precisionaire for finish grinding holes to a part tolerance of 10 millionths, are shown in fig. 2. With the Precisionaires mounted on the machine heads, they were most readily seen by the operators for quick, accurate readings.

All parts which have not been ground straight and round within required limits are hand lapped for correction in a special room, fig. 3. Each woman operator has a Precisionaire and all equipment necessary for cleaning the part. Controlled temperature insures that final measurement will be free from thermal expansion errors.

Fig. 4 shows a close-up view of 5-tube Precisionaire for checking the plunger in five places simultaneously. A movable transparent shield on the instrument face has two lines horizontally through the center which represent a spread of 0.000015 in. If all five floats come between these lines, the part is considered straight.

It is classed by a letter, such as B, F, etc., and is placed in a proper carton on either side of the instrument. The operator is able to see at

a glance whether a part is good or bad. Difference in float positions shown represents approximately 30 millionths of an inch.

Chicago Accounts For 7.2 Pct of Nation's Manufacturing Assets

Chicago

• • • With new additions, Chicago's industrial facilities, on the basis of valuation, represented about 7.2 pct of the nation's manufacturing plant total at the war's end, according to data presented from a study being conducted jointly by the Federal Reserve Bank of Chicago, The Chicago Assn. of Commerce and the Chicago Committee of the CED. The current percentage represents a small decrease from 1939 when the Chicago industrial area had approximately 7.7 pct of the nation's industrial plants.

The six Chicago industries in which the largest additional plant investments were made since June 1940, are transportation equipment, \$450 million; iron and steel, \$350 million; ordnance, \$175 million; chemicals and chemical products, \$110 million; non-ferrous metals and products, \$95 million; and non-electrical machinery, \$60 million.

Despite a drop of 85,000 persons in the civilian population of the Chicago industrial area between April 1940, and the end of 1944, the number of persons employed rose from 1,880,000 to 2,261,000, the study showed. At that level 98.3 pct of the total labor force was working compared with 85.9 pct during April 1940. 'This sharp increase was accompanied by a gain of nearly onethird in the ratio of women workers to the total number employed. At the end of 1944, women represented 37.4 pct of employed persons against 28.5 pct four years earlier.

Metal Powder Group to Meet

New York

• • • The Metal Powder Assn. will hold its annual meeting at the Netherland Plaza Hotel, Cincinnati, Ohio, on Tuesday, Oct. 16, 1945. The association, now located at 420 Lexington Ave., New York 17, consists of 22 producers of metal powders. Its membership has recently been opened to fabricators, suppliers and others in the powdered metal field.

This is under no circumstances to be construed as an offering of these securities for sale, or as an offer to buy, or as a solicitation of an offer to buy any of such securities.

The offer is made only by means of the Prospectus.

110,074 Shares

Standard Forgings Corporation

(A Delaware Corporation)

Common Stock
Par Value \$1 Per Share

Price \$11.50 per Share

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Copies of the Prospectus may be obtained within any State from the undersigned only by persons to whom the undersigned may regularly distribute the Prospectus in such State.

Shields & Company

Paine, Webber, Jackson & Curtis
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September 19, 1945.

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SCIENTIFIC precision controls of every step in the engineering and production of KAYDON bearings assure uniformly dependable bearing performance. KAYDON employs the most advanced instruments for precision check analyses and physical tests of highest grade bearing steel for bearing races, balls and rollers. KAYDON equipment is organized for the entire range of sizes from 4" bore up to extremely large, extremely precise 120" ball and roller bearings...made completely within KAYDON plants!

In addition, KAYDON offers complete facilities for atmospheric controlled heat treating, precision heat treating, salt-bath and sub-zero conditioning and treatment, microscopy, physical testing, and metallurgical laboratory services.

Counsel in confidence with KAYDON. Capacity is available now for production of all types and sizes of KAYDON Bearings.

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KAYDON Types of Standard or Special Bearings:
Spherical Roller Taper Roller
Ball Radial Ball Thrust

Roller Radial Roller Thrust

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THE IRON AGE, October 4, 1945-161

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Tool Builders Plan to Combat Surpluses

• • Machine tool builders, most of whom have long since learned to be cautious in prosperity, are laying long-range and optimistic plans, many of them designed to circumvent to some extent at least the highly volatile market menace of the surplus.

Few if any decisions have been forthcoming on the surplus in the last few days and with sales to lessees in possession continuing to mount, it may be that SPB and/or RFC will have little to say until the road becomes a little rougher than it has been thus far. RFC's worst problem. however, warehousing, is still ahead and in some of the districts the extent of this situation will be difficult to anticipate. In Detroit, according to reports, the surplus moved out rather rapidly but in the Cleveland area the . general picture is not so rosy, which is not due to any fault of the RFC. In Hartford, Conn., at the Colt plant, where RFC put surplus machinery on display, a good idea proved itself. Most of the machine tools there could have been sold two or three times over, even though none of it was new. The older "junk" wasn't shown and RFC took bids at the Clayton price . . . put the bids in a hat and the one drawn out took title to the machine . . . in other words, the auction

method. It is not impossible that sales of this kind will become more frequent.

At this moment, machine tool companies have a sizeable and unsatisfied demand and many among them are planning to raid territories never reached before. Superficially, this would seem to be all well and good, but competent observers point out that in a year demand will be satisfied, much of the money in banks will be paid out in taxes and renegotiation, and at the same time, these companies are going to find that going into a new field also has its difficulties. When this state of affairs is reached, companies will probably be seen dropping out of new fields and coming back to the fold, accompanied by the trimming down of plants.

It is becoming increasingly apparent that there has been too much optimism based on complete failure to realize what the surplus means. Nobody has ever seen 236,000 machine tools in one place, if this very small estimate of the total amount may be taken to be true, and the average person simply can't grasp it - a good year's normal output for the entire industry in one place. A year from now the surplus is going to be a pain in the neck and it is not unlikely that these tools may be peddled at very low

prices which can be easily construed to mean that the Clayton formula is likely to go in a year.

Roughly speaking, the industry had \$90,000,000 in orders with military ratings with only \$10,000,000 canceled, tangible evidence that war contractors in placing orders bought machines with war production in mind and also their postwar requirements. Sales in August, although final figures are not in, are shaping up much better than July's, indicating once more that although cancellations came in, they fell far short of the extent of orders with military ratings.

Dealers are frankly discouraged. For the most part the orders are sporadic and many of them feel that there have been well concealed but definite plans on the part of lessees to let RFC remove the tools, then wait until the surplus really starts to climb, anticipating that surplus property people will come along and ask for just an offer.

Chicago RFC Office Offers Tool Listing

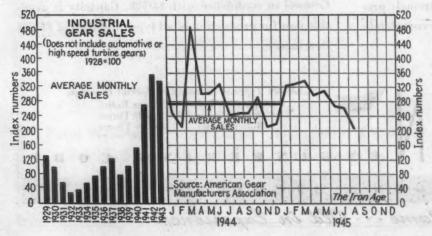
Chicago

• • • A 90-page listing of machine tools and industrial production equipment has been issued by the Chicago office of Reconstruction Finance Corp. under list No. 37, with purchase offers solicited. The list includes abrasive cutoff machines, broaching machines, drill presses, drilling machines, electric welding equipment, electroplating, forging machinery, furnaces, gear cutters, grinders, hydraulic presses, lathes, marking machines, mechanical presses, metal spraying equipment, milling machines, planers, polishing and buffing machines, polishing lathes, portable grinders, presses, shapers and slotters, washers-dryers, welding machinery and equipment. Most of the equipment

is used and in good condition.

AUGUST GEAR SALES DECLINE

... The gear industry, as represented by the members of the American Gear Manufacturers Assn., shows a decrease in volume of sales for August as compared with July of 22 pct. This report does not include turbine or propulsion gearing. The index figure for August was 205.



Has 2-Yr Order Backlog

Winnetka, Ill.

• • Unfilled orders for more than \$110 million worth of engines and parts scheduled for delivery over approximately the next two years are on the books of Continental Motors.

THE SINEWS OF THE ARMORER

have given way to a Woman's Touch

The cutting-off of really large bars, billets or forgings has always been "man's work"—was a slow, costly series of tedious and laborious operations requiring the heaviest equipment, and a crew of sweating and straining handlers.

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nd ver are How different today when a woman's touch on the control button of a MARVEL Giant Hydraulic Hack Saw cuts off the largest pieces, and cuts each to exact size squarely and accurately.

The MARVEL Giant Hydraulic Hack Saw No. 18, capacity (18" x 18") and MARVEL No. 24, capacity (24" x 24") with their revolutionary "roll-stroke" cutting action, cut-off the toughest and hardest steels. They are the larger units in the complete MARVEL System of Metal Sawing, which provides 10 different types of hack saws

ranging down to small economical dry-cutting shop saws. In the MARVEL SYSTEM you will find a saw exactly suited to your needs

— in each case the best saw of its type. See full description in Sweet's Mechanical Files or write us for Catalog.



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NONFERROUS METALS

. . News and Market Activities

Scrap Prices Drop In a Firm Market

New York

• • • The market for copper and copper base alloy scrap is reported to continue remarkably close to ceiling prices, particularly considering the sharp drop in shipments of ingot brass and bronze which in August was reported to total 25,372 tons. This figure compares with 37,262 tons in May and a round figure of 40,000 tons a month during the war. Some weakness has developed yellow brass, it is true, with castings being bought at 6.00c per lb and other prices in line.

Aluminum scrap has held its price structure surprisingly well in view of the large quantities of aircraft scrap which have been placed in the market and ever larger quantities which may be expected to be authorized for disposal. Aluminum scrap grades have long been way below ceiling prices and except for a short period after the end of the war there has been no tendency toward demoralization of the market.

The prices quoted for magnesium scrap, however, are merely nominal as there is little or no market interest in this material.

Antimony Ore Shortage

New York

e • • • Adequate supplies of antimony metal are now reported to be available to meet authorized requirements. Latin American ores from Bolivia and Mexico are smelted at the Texas Smelting and Refining Co. at Laredo, Texas and the Bunker Hill smelter of the St. Joseph Lead Co., the only two domestic producers.

Producers report that there is a significant drop in available supplies of ore, for which they now find themselves in competition with European consumers. Domestic producers are now required to compete on a price basis with Europeans for available Latin American supplies for, to date, there has been no indication of resources of the metal available from China.

August Brass Mill Production Declines

Washington

• • • A 400 pct production increase by the brass mill industry during the war has been reported by C. L. Homer, chief of the Brass Mill Section of the Copper Division, WPB. Following the German break-through the industry pushed brass mill production in March to a record monthly peak of 517.5 million lb, he said. This compares with an average peacetime production of around 100 million lb.

August production, however, continued to decline, dropping to 175.7 million lb from 201.5 million lb in July.

The resignation of Mr. Homer was announced. He expects to join the Bridgeport Brass Co. within the next few days.

Deficit in Lead Supply To Come From Stockpile

Washington

• • • Withdrawals from government stockpiles assure slightly increased supplies of lead in the fourth quarter for reconversion uses.

Estimated fourth quarter requirements of 265,000 tons represent an increase of 9000 tons from the preceding quarter. At the same time, estimated fourth quarter supplies of 244,000 tons are 28,000 tons less than in the third quarter.

The fourth quarter deficit of 21,500 tons will be absorbed by tapping the current government stockpile of 87,000 tons. The deficit is attributed principally to decreased imports, foreign supplies having been diverted elsewhere since the end of hostilities.

Fourth quarter supplies consist of 125,000 tons domestic production, 73,000 tons secondary lead and 46,000 tons imported.

The chemicals industry will benefit from the increased allocations to the extent of 11,000 tons which will be used principally in the manufacture of white lead used in paint. Battery cable manufacturers will receive somewhat more than in the third quarter but other users are expected to receive about the same as in the third quarter.

Brazil's Chromium Production Growing

Rio de Janeiro

 Production of ferrochromium is now under way in Brazil on a commercial scale.

More than 33,000 lb were exported since the beginning of 1945 by the Nickel Co. of Brazil (Companhia de Níquel do Brazil) at Liberdade, Minas Gerais.

Brazil, which is said to rank after Cuba as the Hemisphere's leading source of ferrochromium, has five principal chrome producing areas. Three are in the State of Bahia, one in Minas Gerais and one in the State of Goiaz.

The Bahia deposits are the most important. One of them, at Camp Formoso, has ore reserves estimated at 4 million tons, and containing about 36 pct of chromite. Santa Lucia has approximately 100,000 tons of ore. with chrome oxide content varying between 36 and 42 pct. Boa Vista has deposits estimated at more than 20,000 tons, and the ore has a content of from 30 to 36 pct of chrome oxide.

Piauí, Minas Gerais, has ore deposits which contain 34 to 47 pet of chrome oxide.

Foreign Lead Goes Abroad

New York

• • • Lead continues to be in short supply because imports of the metal from abroad are not holding up. Mexican lead is being sold abroad in a situation quite similar to the case of antimony.

However, the industry expects that within a reasonable time there may be some relaxation in authorized consumption, on a percentage basis for use in batteries, pigments and perhaps cables. Such easing of restrictions would naturally come out of the stockpile which was last reported at about 86,000 short tons. Fourth quarter requirements already exceed the supply by some 20,000 tons which of course implies a reduction of the stockpile by that amount. At that rate the stockpile should last for a year.

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dollars per ib. contained Be. \$17.00
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20,000 ib.)
21,500 to \$1.57
Copper, electro, Conn. valley
12,00
Copper, electro, Conn. valley
12,00
Gold. U. S. Treas, dollars per os. \$35.00
Indium, 93.3%, dollars per troy oz. \$2.25
Iridium, dollars per troy oz. \$90 to \$100
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12,00

Remelted Metals

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Copper, Copper Base Alloys

(Mill base, cents per lb.) | Extruded | Shapes | Rods Sheets | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20.37 | 20 Extruded

Aluminum

(Conte per 15., subject to extras en gage, stee, temper, finish, factor number, etc.)
Tubing: 2 in. O.D. x 0.065 in. wall 28, 40c. (%H); 528, 61c. (O); 248, 67%c. 40c. (½H); 52S, 61c. (O); 34S, 67½c. (T).

Pinto: 0.360 in. and heavier; 2S and 3S, 21.2c.; 52s, 34.2c.; 61S, 22.3c.; 24S, 24.2c.

Flat Sheet: 0.188 in. thickness; 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 34S, 26.7c.

2000-lb. base for tubing; 20,000-lb. base for plate, flat stock.

**Batraded Shapes: "As extruded" temper; 2000-lb. base, 28 and 38, factor No. 1 to 4, 26.6c.; 148, factor No. 1 to 4, 36c.; 248, factor No. 1 to 4, 31c.; 248, factor No. 1 to 4, 34c.; 538, factor No. 1 to 4, 28c.; 618, factor No. 1 to 4, 28

The factor is determined by dividing perimeter of shape by weight per lineal foot.

Wire Red and Bar: Base price; 178T and 118T-3, screw machine stock. Rounds: ¼ im., 28 ½c. per lb.; ¼ in., 36c.; 1 in., 28 ½c.; 2 in., 28 ½c.;

23c. 24ST, rectangles and squares, random or standard lengths. 0.093-0.187 in. thick by 1.001-2.000 in. wide, 33c. per ib.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 37½c.

Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb. or more, 68c. a lb.; 28 to 90 lb., 58c.; less than 25 lb., 68c.

NONFERROUS SCRAP METAL QUOTATIONS

†(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums—other prices are current quotations)

	C	opper,	Cop	per	Base	Allo	ys
OP	4	Group	11				
No.	1	wire, I	No. 1	bear	A cobi	per	9.7

	1 th								9.10
	nned								9.75
No.	2 wi	re, m	ized	he	AVI	00	PP	DF	8.76
	per t								8.76
Lig	bt cor	pper							7.76
Cop	per b	oring							9.75
No.	2 cor	per l	rizoc	1ga					8.74
Los	d cev	ered	COM	Jer	wir	8, 1	cab	le	6.00
Les	d co	vered	1	plep	hon	6,	Do	TOW	
C	able .								6.04
	ulated								5.10

OPA Group 2

Bell metal	10.00
High grade bronze gears	13.25
High grade bronze sollds	11.50
Low lead bronze borings	11.50
Babbitt lined brass bushings	
High lead bronze solids	10.00
High lead broase borings	10.00
	10.75
Red trolley wheels	
Tinny (phosphor bronze) borings	10.50
Tinny (phosphor broase) solids	19.50
Copper-nickel solids and borings	9.25
Bronze paper mill wire cloth	9.50
Aluminum bronze solida	9.00
Soft red brass (No. 1 composition)	9.00
Soft red brass borings (No. 1)	9.00
Gilding metal turnings	8.50
Contaminated gilded metal solids.	2.00
Unlined standard red car boxes	3.25
Lined standard red car boxes	7.75
Cocks and faucets	7.75
Mixed brass screens	7,75
Red brass breakage	7.50
	6.25
Old nickel silver solids, borings	0.20
Copper lead solids horings	
Yellow brass castings	6.00
Automobile radiators	7.25
Zincy bronze borings	7.00
Zincy bronze solids	8 186
There is the property of the second state	
OPA Group 3	
Or A Group 3	

Fired rifle	shells		 				
Brass pipe			 				
Old rolled l							
Admiralty (
Muntz meta							
Plated bras Manganese							
Manganese							
		624	gra				

OPA Group 4

Price	varies with	analysis.	1 Land	COD-
	to 0 40 mm			

Refinery brass 4.50°

0.41 to 1.00 per cent. Lend content

Other Copper Alloys

Briquetted	Cartridge	Brass	Turn-	Marie Co
Cartridge	Brass Tur	nings.	Loose.	7.878
Cartridge Loose Yell	ow Brass	Trimmi	ngs	7.878

Aluminum*

Plant scrap, sogregated 18 solids	8.00
Dural alloys, solids 14, 17, 18, 248 258 turnings, dry basis	4.00
Low copper alioys 51, 52, 61, 638 solids turnings, dry basis	7.25
Plant scrap, mixed Solids Turnings, dry basis	4.00

Obsolete scrap		
Pure cable	 	8.00
Old sheet and utensils		6.00
Old castings and forgings .		5.00
Pistons, free of struts	 	5.00
Pistons, with struts	 	3.00
Old alloy sheet	 	5,04

Magnesium*

Pure so	lids	plant ser	other	colida,	63	empt
Borings	and	turnings				1.50
140407 154			DOWN			

Mixed,	contaminated plant	scrap	
Grade 1 Grade 1 Grade 2	borings and turnings solids borings and turnings		3.00 2.00 3.00 1.00
- Wom	order the month derive		

Zinc

New sinc elippings, trimmings	6.50
Engravers, lithographers plates	6.50
Old zine scrap	4.78
Unsweated sine dross	5.00
Die cast slab	4.50
New die cast scrap	4.48
Radiator grilles, old and new	3.50
Old die east scrap	3.00
Old die dest some	

Lead

Deduct 0.65c, a lb. from refined metal basing point prices or soft and hard lead including cable, for f.e.b. point of shipment price.

Nickel

Ni content 98+%, Cu under 1/4%, 36c. per lb.; 90 to 98% Ni, 26c. per lb con-tained Ni.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cente per lb., f.o.b. shipping point in 500 lb lote)

Copper, frt. allowed
Cast, oval, 15 in. or longer ... 25½
Electrodeposited ... 18%
Rolled, oval, straight ... 19½
Curved ... 30%
Brass, 80-30, frt. allowed
Cast, oval, 15 in. or longer ... 23%
Zinc, cast, 99,99, 15 in. or longer ... 16½
Nickel, 99 per cent plus, frt. allowed
Cast ... 47
Rolled, depolarised ... 48
Silver. 999 fine
Rolled, 100 oz. lots, per oz. ... 30

Cuchinging	
(Cents per 10., f.o.b. shipping po	dess)
Copper cyanide, 1-5 bbls	34.00
Copper sulphate, 99.5, crystals, bbis.	7.78
Nickel salts, single, 435 lb. bbis., frt. allowed	13.50
Silver cyanide, 100 oz. lots, per oz.	0.608
Segum cyanide, 96 per cent, do- mestic, 100 lb. drums	16.00
Zine cyanide, 100 lb. drums	20,00
Zine sulphate, \$9 per cent, crys-	6.85

Market Firm, Volume Down, Scrap Scarce

New York

• • • Once again this week there isn't a single scrap price change reported throughout the country, with practically all grades continuing at ceilings despite strike reports among consumers and a long standing expectation by all factors that prices would be likely to drop some.

Scrap volume is of course well below wartime levels but this has had little or no influence on the price structure, since neither producers nor dealers are sending out scrap in wartime volume. Some members of the industry believe that supply may continue short until civilian production is increased from the present trickle into a mighty stream.

Blast furnace scrap is particularly short in all areas, thus confirming predictions made months ago by deal-

For additional scrap news see p. 117.

ers in the Pittsburgh area where military cutbacks of steel products first developed most significantly.

There is growing evidence that foundry scrap in all grades is in easier supply than has been the case during the war. Until now, cast was never plentiful even when all other grades of scrap dropped sharply in the latter half of 1944.

The end of scrap allocations is expected shortly after Oct. 1, the date at which the Allocation Section of the Steel Division closed its operations, except for some allocations of railroad scrap whose expiration dates have not been reached. Some dealers in the Pittsburgh area are understood to be somewhat concerned over the continued allocation of scrap for civilian requirements.

PITTSBURGH-The market here is a healthy one, but the volume of scrap moving has fallen terrifically from that of the war peaks. Some observers estimate that present scrap buying is only about 25 pct of what it was early this year. Dealers indicate that scrap sources have been drying up and there is very material forthcoming. one large consumer here is getting all the scrap desired at a springboard of 50c. a ton, and figures that if the springboard were upped to \$1, the scrap would be far in excess of what could be handled. The turnings market remains at \$14.50 to \$15.00, but there is very little of this material moving. The district's largest consumer of blast furnace scrap is temporarily out of the market because of a shutdown of blast furnace capacity, while another consumer is not buying near as much as heretofore.

UNOMFERZOUS METALS PRICES

CHICAGO--Purchase of more than 25,000 tons of prime openhearth grades, including bundled machine shop turnings, at ceiling by the principal district consumer last week definitely confirmed price firmness. Some weakness had previously been indicated in bundled machine shop turnings in small sales, but the strength in other grades had been anticipated. Prices on blast furnace grades remain nominal, with no new mill purchase, but transactions in the trade indicate a weakness ranging to \$1.50 below ceiling in short shoveling turnings. Prices on steel foundry grades, including railroad specialties, also appear susceptible to attack, although definite transactions are lacking.

PHILADELPHIA—Several mills here have held up shipments of openhearth grades. The lack of manpower at the mills has caused reduced operations. Turnings are still scarce and in great demand. Unprepared scrap is still plentiful. There is no change in price.

DETROIT—Prices continue at ceiling here on all grades, although some blast furnace material from dealer yards is moving slightly below the top prices. Production scrap meanwhile continues very scarce, and this was well indicated by the lists which closed late in September. Many were for tonnages of a tenth to a fourth the normal quantity. Foundries are displaying some reluctance to buy, due to fears of labor troubles, but this is not enough of a factor to throw any shadow on peak prices for cast grades.

BOSTON—Other than foundry buying of cast, new business is virtually nil. Movement of shipyard material continues but on a smaller scale than heretofore, and brokers are still working on old contracts for turnings and borings taken at ceiling prices. The trade awaits developments. The suspense makes for pessimistic sentiment, particularly as it relates to borings and turnings. Scrapping of allocations Oct. 1 went almost unnoticed here.

NEW YORK—Scrap demand was adequate to continue all grades at ceilings this week particularly in view of the small amount of scrap which is coming into the market. The opinion is held in some quarters here that strikes current in some steel producing areas may serve to reduce demand somewhat at a later date. It is reported that cast scrap is more available at the present time than at any time since the inception of the armament program. Military cancellation layoffs have not yet found their way back into the local scrap industry

here and this factor is expected to continue to restrict the flow of scrap for some time in the future.

BUFFALO—The monotony of hand-to-mouth buying in the local market was broken last week by one of the leading mills. This consumer which had shown little interest in openhearth scrap for more than a month put out October contracts for 10,000 tons, mostly No. 2 heavy melting at ceilings. Springboards, however, were not included. The turn of the quarter witnessed a smart increase in water shipments of scrap with this week's receipts scheduled at 15,000 tons. Two Lake cargoes accounted for two-thirds of the tonnage and canal barges the remainder.

CLEVELAND—With the exception of electric furnace scrap, all grades are in tight supply, and bringing ceiling prices, including electric furnace. Shipments are down, and an order for short turnings from a consumer in Chattanooga, Tenn., with instructions to pay ceiling prices, seems to index the situation. Brokers report that low phos, for which there is only a limited market in Cleveland, is hard to ship out of town at ceiling prices and consumers in Canton and Warren are apparently in no mood to pay the springboard.

ST. LOUIS-The threatened coal strike has caused renewed buying of the better grades of scrap iron by steel mills who fear that production of pig iron would be curtailed by the closing down of the mines. This, plus the fact that there is no surplus scrap, has given a firm tone to the market with prices unchanged. The market for machine shop turnings is weak, but with the supply short prices are unchanged. The first railroad list of unallocated scrap in some time was issued by the St. Louis-San Francisco of approximately 2000 tons. 1000 tons was heavy melting steel and 500 tons rails, virtually all going to dealers at the ceiling price.

CINCINNATI-Although the iron and steel scrap market in this area continues to be firm, there is no large buying in the area. Two of the outstanding outlets in this district have been out of the market for some time, definitely, while other interests are accepting scrap, only on old commitments. Brokers and dealers in the area continue to mark time in an effort to determine the trend of the market and the effect of the termination material when it appears. Foundry grades continue to be reasonably active with a rather marked disposition of the part of foundries in the area to build

BIRMINGHAM—Movement of scrap in this market, is still slow although availability of material is increasing daily from contract terminations at industrial plants. There is no easing of the labor problem at mills' and at dealers' yards.

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages. Where asterisks are used on quotations below, this indicates a ceiling price to which must be added brokerage fee and adjusted freight.

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daily

ustrial labor yards.

1.78 (97.18 - 98.12 98.12 (Av. mail		CONTRACTOR OF THE PARTY OF THE
PITTSBURGH	DETROIT	NEW YORK
Per gross ton delivered to consumer:	Per gross ton, brokers' buying prices:	
Per gross ton delivered to consumer: No. 1 hvy. melting	Per gross ton, brokers' buying prices: No. 1 hvy. melting	Brokers' buying prices per gress tan, on cars: No. 1 hvy. melting
RR. coll springs 24.50°		Per gross ton delivered to consumer:
Rolled steel wheels 24.50°	PHILADELPHIA Per gross ton delivered to consumer: No. 1 hvy. melting \$18.75° No. 2 hvy. melting 18.75° No. 2 bundles 13.75° Mach. shop turn 13.75° Sheveling turn 15.75° Cast iron borings 13.60 to 14.90 Mixed bor. & turn 13.75°	No. 1 hvy. melting \$19.25° No. 1 bundles 19.25° No. 2 bundles 19.25° No. 2 hvy. melting 19.25° Ma.'h. shop turn. 14.25° Shoveling turn. 16.25° Cast Iron borings 15.26° Mixed bor. & turn. 14.25° No. 1 cupola cast 20.00°
No. 2 hvy. melting	No. 1 cupola cast	Stove plate
No. 1 RR. hvy. melt 19.75° Reroll ralls	N. Serberts Till State of the Company of the	Per gross ton delivered to consumer:
Miscellaneous rails Rails 3 ft. and under 22.25° Locomotive tires, cut 22.75 to 22.25° Cut boisters & side frames 20.25 to 21.25 Angles & splice bars 22.25° Standard stl. car axles 35.00 to 25.50 No. 3 steel wheels 23.25° Agricul. malleable 22.00° RR. malleable 22.00° No. 1 mach cast 20.00° No. 1 agricul. cast 20.00° Hyy. breakable cast 16.50° RR. grate bars 15.25° Cast iron brake shoes 15.25° Stove plate 19.00° Clean auto cast 20.00° Cast iron carwheels 20.00°	ST. LOUIS Per gross ton delivered to consumer: Heavy melting	No. 1 hvy. melting
CINCINNATI	CT-CHOOL YEST BANGSON, MANY IN A COLUMN	Rails 3 ft. & under 33.00°
CINCINNATI Per gross ton delivered to consumer: No. 1 hvy. melting \$19.50°	BIRMINGHAM Per gross ten delivered to consumer:	Rails 18 in. & under
No. 2 hvy. melting 19.50° No. 1 bundles 19.50° No. 2 bundles 19.50° Mach. shop turn. 210.50 to 11.00 Shoveling turn. 12.50 to 12.00 Mixed bor. & turn. 11.50 to 12.00 Mixed bor. & turn. 11.50 to 12.00 No. 1 cupola cast. 20.00° Hvy. breakable cast. 16.50° Stove plate 19.00° Serap rails 21.00°	No. 1 hvy. melting \$17.00* No. 2 hvy. melting 17.00* No. 2 bundles 17.00* No. 1 busheling 17.00* Long turnings 39.50 to 10.00 Cast fron borings 11.00 to 11.50 Bar crops and plate 17.50 to 18.00 Structural and plate 17.50 to 18.00 No. 1 cast 20.00* Stove plate 17.00 Steel axles 18.00* Scrap vails 18.50	SAN FRANCISCO Per grees ten delivered to consumer: RR. hvy. melting \$16.60 No. 1 hvy. melting 16.00 No. 2 hvy. melting 18.00 No. 2 hales \$13.50 to 14.25 No. 3 hales 9.50 to 16.59 Mach. shop turn 7.00 Elec. furn. 1 ft., und. 15.50 to 17.00 No. 1 cupola cast 19.00 to 21.00
BOSTON Dealers' buying prices per gross ton, f.o.b. cars No. 1 hvy. melting	Rerolling rails	COS ANGELES Per grees ton delivered to consumer: No. 1 hvy. melting
No. 1 and 2 bundles	YOUNGSTOWN Per gross ton delivered to consumer: No. 1 hvy. melting	No. 1 cupola cast 19.00 to 31.00 SEATTLE Per grass for delivered to consumer: RR. hvy. melting \$13.50
Machinery cast 21.00 to 23.51° Breakable cast 21.57 to 21.87° Stove plate 20.00 to 22.51°	Hydraulic bundles 20.00° Mach. shop. turn 15.00° Short shovel turn 17.00° Cast iron borings 16.00°	No. 3 hundles

Comparison of Prices . .

									NA MARINE
Flat-Relied Steel:	Oct. 2,		Aug. 28,		Pig Iron: 0 (per gross ton)	et. 2,	Sept. 25,	Aug. 28	, Oct. 3,
(cents per pound)	1945	1945	1945	1944	(per gross ton)	1945	1945	1945	1944
Hot-rolled sheets	2.20	2.20	2.20	2.10	No. 2 foundry, Phila\$2	6.84.	.\$26.84	326.84	\$25.84
Cold-rolled sheets	3.05	3.05	3.05	3.05	No. 2, Valley furnace 2	5.00	25.00	25.00	24.00
Galvanized sheets (24 ga.)	8.70	3.70	3.70	3.50	No. 2, Southern, Cin'ti 2	5.44	25.44	25.44	24.44
Hot-relled strip	2.10	2.10	2.10	2.10	No. 2, Birmingham 2	1 38	21.38	21.38	20.38
Cold-rolled strip	2.80	2.80	2.80	2.80	No. 2 foundry, Chicago; 2	5 00	25.00	25.00	24.00
Plates	2.25	2.25	2.25	2.10	Pasis dal'd anatom Pa 9	6 94	26.34	26.34	25.34
Plates, wrought iron	3.80	3.80	3.80	3.80	Basic, del'd eastern Pa 2	4 50	24.50	24.50	28.50
Stain's c.r. strip (No. 302)		28.00	28.00	28.00	Basic, Valley furnace 2	4.00	25.00	25.00	24.00
			-	,	Malleable, Chicagot 2	5.00	25.00	25.00	24.00
Fin and Terneplate:		3 - 22	31000		Malleable, Valley 2	0.00			
(dollars per base box)		13 2 3			L. S. charcoal, Chicago 4	2.34	42.34	42.34	37.34
Tinplate, standard cokes	\$5.00	\$5.00	\$5.00	\$5.00	Ferromanganeset13	0.00	185.00	135.00	135.00
Tinplate, electrolytic		4.50	4.50	4.50	A The section of the day	14			- FYM.
Special coated mfg. ternes		4.30	4.30	4.30	† The switching charge for decago district is 60¢ per ton.	HAGLA	to round	ries in u	de Cm-
The state of the s		41 3	21	2.00	i For carlots at seaboard.				*
Bars and Shapes:					A STATE OF THE PARTY OF THE PAR	09.68	A		
(cents per pound)					Scrap:				
Merchant bars	2.25	2.25	2.25	2.15	(per gross ton)				
Cold-finished bars		2.75	2.75	2.65				000.00	
Alloy bars		2.70	2.70	2.70	Heavy melt'g steel, P'gh \$2		\$20.00	\$20.00	\$16.25
Structural shapes	2.10	2.10	2.10	2.10	Heavy melt'g steel, Phila. 1	8.75	18.75	18.75	14.50
Stainless bars (No. 302)		- 1			Heavy melt'g steel, Ch'go 1	8.75	18.75	18.75	17.50
		24.00	24.00 4.40	24.00	No. 1 hy. comp. sheet, Det. 1	7.32	17.32	17.32	11.75
Wrought iron bars	4.40	4.40	4.40	4.40	Low phos. plate, Youngs'n 2	2.50	22.50	22.50	19.00
Wire and Wire Products:		THE RESERVE			No. 1 cast, Pittsburgh 2		20.00	20.00	21.50
(cents per pound)		100			No. 1 cast, Philadelphia 2		20.00	20.00	22.75
Bright wire	975	2.75	2.75	2.60	No. 1 cast, Chicago 2		20.00	20.00	22.17
Wire nails	9 00	2.90	2.90	2,55	The many waterways.		Churchie	100000	
	2.30	2.00	2.90	2,00	Cake Connellevilles		being tillate	mil) 198922	24.
Rails:	ATT OF	and the			Coke, Connellsville:				
(dollars per gross ton)			6				marine Bull		
Heavy rails\$	43.00	\$43.00	\$43.00	\$40.00	Furnace coke, prompt \$	7.50	\$7.50	\$7.50	\$7.00
Light rails	45.00	45.00	45.00	40.00	Foundry coke, prompt	9.00	9.00	9.00	8.25
AND THE RESERVE OF THE PARTY OF	rendit. 11		10	10000				4. Holledil	do sylling.
Semifinished Steel:					Nonferrous Metals:				
(dollars per gross ton)		1.1.1.1			(cents per pound to large	buy	ers)		
Rerolling billets\$		\$36.00	\$36.00	\$34.00			LA STELLT	12,00	12.00
Sheet bars	36.00	36.00	36.00	34.00	Copper, electro., Conn 1		12.00		
Slabs, rerolling	36.00	36.00	36.00	34.00	Copper, Lake 1	2.00	12.00	12.00	12.00
Forging billets		42.00	42.00	40.00	Tin, Straits, New York 5	0.00	52.00	52.00	52.00
Alloy blooms, billets, slabs		54.00	54.00	54.00	Zine, East St. Louis	0.20	8.25	8.25	8.25
Control of the contro	CVA E.	11951	STANSFORM.	A 1 149 35 11	Lead, St. Louis	0.35	6.35	6.35	6.35
Wire Rods and Skelp:			417		Aluminum, virgin, del'd 1	15.00	15.00	15.00	15.00
(cents per pound)	ETUT QU	361 .08		A STATE OF THE PARTY OF THE PAR	Nickel, electrolytic 8		35.00	35.00	35.00
Wire rods	2.15	2.15	2.15	2.00	Magnesium, ingot 2	20.50	20.50	20.50	20.50
Skelp	1.90	1.90	1.90	1.90	Antimony, Laredo, Tex 1	14.50	14.50	14.50	14.50
Of the second of the second of the second	wik E	100 01	TR		A DE SON THE STATE OF THE STATE		2018	HEAT OF S	TO PARTY

Composite Prices .

Oct. 2, 1945. 2 424714 per lb

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942 and 1943. See explanation of the change on p. 36 of the Apr. 22, 1942 issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite prices for the current quarter are an estimate based on finished steel shipments for the previous quarter. These figures will be revised when the actual data of shipments for this quarter are compiled.

One week One month	ago2.4	1247 1157	1¢ per lb 1¢ per lb	\$24.61 per	gross ton	\$19.17 per	gross ton
One year a		1189		\$23.61 per	The state of the s		
1945	HIGH			HIGH		HIGH	LOW
				\$24.61 Feb. 20		\$19.17	\$19.17
1049	2.30837¢ Sept.	D	2.21189¢ Oct. 5	\$23.61	\$23.01	19.17	
1948	Z.25018¢			23.61		19.17	
1942	2.26190¢		2.26190¢			19.17	
1941	2.43078¢			\$28.61 Mar. 20	\$23.45 Jan. 2	\$22.00 Jan. 7	\$19.17 Apr. 10
1940			2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	manual for the second		2.26689¢ May 16		20.61 Sept. 12		14.08 May 16
1938			2.27207¢ Oct. 18	23.25 June 21	19.61 July 6		11.00 June 7
1987				23.25 Mar. 9	20.25 Feb. 16		12.67 June 8
1936			2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11		12.67 June 9
1935		1		18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1984	2.15367¢ Apr.		1.95757¢ Jan. 2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1933		3	1.75836¢ May 2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 8
1932	1.89196¢ July	. 5	1,83901¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1931	1.99626¢ Jan.	13	1.86586¢ Dec. 29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1930	2.25488¢ Jan.	7	1.97319¢ Dec. 9	18.21 Jan. 7	15.90 Dec. 16	15.00 Feb. 18	11.25 Dec. 9
1929	2.31773¢ May	28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 3
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PIG IRON

SCRAP STEEL

TYPE "A"

1944

5.84 4.00 4.44 0.38 4.00 5.34 8.50 4.00 7.34

4.50 7.50 1.75 9.00 1.50 2.75 2.17

7.00 8.25

2.00 2.00

8.25 6.35 15.00 35.00 20.50

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The Multiple Life of this CLUTCH HEAD Type "A" Bit . . . unlike the fabled "nine"

of the feline species . . . is definitely beyond all conjecture.

Time, and time, and time again, this tool is fully restored to its original efficiency by a simple 60-second application of the end surface to a grinding wheel.

Each repeated grinding sends it back to the assembly line with a new lease on life . . . to MULTIPLY BY THOUSANDS the number of screws driven per bit.

Here is tool economy that CLUTCH HEAD alone can deliver ... economy that is unmatched with any other screw on the market.

Here is freedom from the expense, bother, and delay involved in "back-to-the-factory" shipments for reconditioning.

And here, too, is a tool so ruggedly engineered that it stands up through a longer "spell" of continuous driving, free from change-off interruption.

But standardization of your assemblies on CLUTCH HEAD Screws gives you other advantages for faster, smoother, safer, lower cost production:

- The safety of automatic Center Pivot entry for straight non-slip driving.
- All-square contact for effortless driving with freedom from end pressure to combat ride-out as set up by tapered driving.
- CLUTCH HEAD's positive Lock-On for easy one-handed reaching.
- Simplified field service because CLUTCH HEAD is the only modern screw designed for operation with the ordinary screwdriver.

You are invited to make your own test of these and other exclusive advantages by asking us to mail you



a package assortment of CLUTCH HEAD Screws, sample Type "A" Bit; and fully Illustrated Brochure.





UNITED SCREW AND BOLT CORPORATION CLEVELAND 2 NEW YORK 7 CHICAGO 8

Prices of Finished Iron and Steel

Steel prices shown here are f.o.b. basing points, in cents per pound unless otherwise indicated. Extras apply. Delivered prices do not reflect 3 pct tax on freight. (1) Mill run sheet, 10¢ per 100 lb under base; primes, 25¢ above base. (2) Unassorted commercial coating. (8) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25¢ per 100 lb to fabricators. (8) Also shafting. For quantities of 20,000 to 39,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (11) Boxed. (12) This base price for annealed, bright finish wires, commercial spring wire. (13) Produced to dimensional tolerances in AISI Manual Sect. 6. For price exceptions to finished and semi-finished steels turn several pages.

										-		10	DEL	IVERED	70
Basing Points	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- Ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Onto	Gulf Ports, Care	Parific Porta, Care	Detroit	New York	Phile- delphis
SHEETS Bot-rolled	2.20€	2 30e	2 204	2 20€	2 20¢	2 20e	2 20e	2 20e	2 30e	2 20¢		2.78e	2 304	2.44¢	2.376
Cold-rolled 1	3 05e	3 05e	3 064	3 05e		3 05e	3 05c		3 15e	3 05e		3 70e	3 154	3 394	3 374
Galvanised (24 gage)	3 70€	3 70e	3 70e		3 70€	3 70e	3 70e	3 70e	3 80€	3 70e		4 25¢		3 94¢	3 876
Enamoting (20 gage)	3 45e	3 45¢	3 45e	3 45¢		No.	3 45é		3 55¢	3 45e		4 104	3 554	3 814	3.77¢
Lone ternee 9	3 80é	3 804	3 800									4 554		4 16e	4 124
STRIP Bot-rolled ²	2.10∉	2 10¢	2 10e	2 104	2.104		2 10e			2 10¢		2.75¢	2 20€	2 46¢	
Cold-rulled 4	2 80€	2 90é		2 80¢			2 80¢	(Wo	rcester=2	.00()			2 90¢	3 16¢	
Cooperage stock	2 20e	2 20¢			3 20¢		2 204	999			The second			2 56¢	200
Commodity cold-rolled	2 954	3 05e		2 95e			2 04,	(Wol	renter = 1	.35¢)			3 854	3 31¢	
YIN PLATE Standard cokes, base box	\$5 00	\$5 00	\$5 00						\$5 19		Mil			5 36¢	5.324
Electro, boz 0 25 lb 0 50 lb 0 75 lb	\$4 35 \$4 50 \$4 65	\$4 35 \$4 50	\$4 35 \$4 50 \$4 65						\$4 60 \$4 75			300			
BLACK PLATE	3 054	3 064	3 05é				1		3 154			4 08411			3 37¢
TERMES, MFG. Special coated, base box	\$4 30	84 30	\$4 30			E			84 40						
BARS Carbon steel	2.25¢	2 25¢	2 25∉	2 75e	2 25¢	2 25¢	- 3	(D	uluth=2.	15¢)	2 60∉	2 90∉	2 35∉	2 594	2 57¢
Rail steel	2.25∉	2 25€	2 25€	2 25¢	2 25€	2 25¢					2 60¢	3 90¢			
Reinforcing (billet) 7	2.15∉	2.15¢	2 164	2 15e	2 15e	2 15e	2 15¢	2 15e			2 504	2 55¢	2 254	2.804	1290/6
Remorcias (rail) ?	2.15€	2 18¢	2 15e	2.152	2 15¢	2 18e	2 15e		111-5		2 50€	2 554	2.254		2.476
Cold-figured 8	2 75e	2.78e	2 784	2.75é		2 75e			(Detroit	2 806)	(Toler	0-2.906		3 094	1 074
Allay, bot-rolled	2.70∉	2 70é		5-13		2 70e		Bethiebe	m, Massi	loo, Canto	a = 2.70¢	ml 16	2 80#		
Alloy, cold -drawn	3 35€	3 35é	3 354	3 354	100	3 354	night.			Mary Mary	is Type	Time	3 454		
PLATES Carbon steel 13	2 25∉	2 25é	2 25é	2 25#	2 25¢		2 25¢	2 25¢	oatesville	and Clays	2 60¢	5¢) 2.80¢	2 47€	2 44¢	2 30¢
Floor plates	3.50¢	8 50¢			100					3 7536	3.854	4 15¢		3.86#	1 20
Alloy	3 504	3 50e			(Cos	tesville =	.5041				3 954	4 184		8 704	3 594
SHAPES Structural	2 10e	2 104	2 104		2 104	2 104		Bethlahes	n = 2.10 <i>i</i>)		2 454	2 754		2 27¢	2 216
SPRING STEEL, C-R 0.36 to 0.50 carbon	2.80∉			2 804	No.	i lai	(Wor	rester=1	(900.	10 m 1/1	A lord	IT Linza			
0.51 to 0.75 carbon	4 30¢			4 30é			(Wor	reester - 4	1.504)						
0.76 to 1.00 carbon	6.15¢			6 154		Total !	(Was	receier = 6	1.25¢)	1000				EST	
1.01 to 1 25 carbon	8 354	FILE	2.11-1	R 35¢		1. 7	(Wor	reater = i	3.55é)	to said	si At			100	
WiRE * Bright 12	2.75€	2.75∉	1150	2 75é	2 75é		(Wor	cester=2	.85é)	(Duluth=	2.80é)	3.25∉			3 074
Galvanised			V (ye :		Add p	roper sise	extra and	galvanis:	ng extra i	o Bright F	Wire base				
Spring (high earbon)	3 35é	3 35¢		3 354			(Wo	rester=	3.45é)			3 85€			3 676
PILING Steel sheet	2.40€	2.40¢	- 1			2.406			10712	70 5		2.954	-2	5 3	3.726

SEMIFINISHED STEEL

Ingots, Carbon, Rerolling
Base per gross ton, f.o.b. mill.... \$31.00

Base per gross ton, some lingots, Carbon, Forging
Base per gross ton, f.o.b. Birming-ham, Buffalo, Chicago, Cleveland, Gary, Pittsburgh, Youngs-

Ingota, Alloy
Base per gross ton, f.o.b. Bethlehem, Buffalo, Canton, Coatesville, Chicago, Massillon, Pitts-burgh

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are \$2.00 higher; delivered E. Michigan, \$3.00 higher; f.o.b. Duluth, billets only, \$2.00 higher; billets f.o.b. Pacific ports are \$12.00 higher. Provo, \$11.20 higher. Delivered prices do not reflect. \$3 pct tax on freight rates.

Per Gross Ton

Alloy Billets, Blooms, Slabs

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point. Per Gross Ton Openhearth or bessemer

Most versatile of modern metals... their unique combinations or the future

199

O Phila-

2 37¢ 3 37¢ 3 87¢

3 77¢ 4 12¢

5.824

37e

2 57¢

47¢

30¢ 3 89¢ 1 89¢

67é

igher:



the commonly used chromium Nickel type, stallness steel that lines this fractionating column possessus natural immunity to tust and corrosion under virtually all exidizing acid conditions. Its resistance to creep, scale or exidation at high temperatures assures long economical operation, Built by A. O. Smith

Corporation, Milwaukee, this column, including the top section, exceeds 125' in length.

international Nickel are miners, ameliars and remores of Nickel, an important ingredient of the stainless steels, but do not produce stainless steels. If interested, places communicate with established sources of supply for stainless steels.

THE INTERNATIONAL NICKEL COMPANY, INC. 17. Wall 5 1919

MACHINES INSTALL REEVES-EQUIPPED

Off the drawing boards, out of the laboratories and experimental rooms, new streamlined models of thousands of production machines are coming

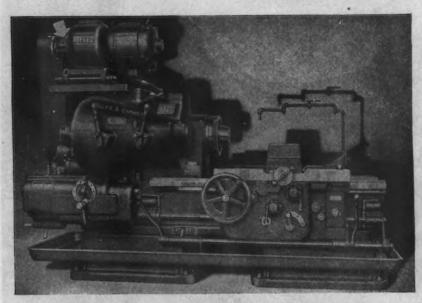
A new era of building, of making and selling things for better living has be-gun. The old American Spirit of Competition is to bloom again.

Machines that have the edge in competition will include among their advantages—complete speed adjustability, as provided by REEVES. Record breaking production of the materials and weapons of war proved as never before that the right speed for each changing condition gets any job done better and faster.

Designers and builders of 1,871 different makes of machines now include REEVES Variable Speed Control as standard equipment. And the list is growing rapidly. Look for the familiar REEVES handwheel on any machine you buy. It is your assurance of faster, better processing under every changing condition.

REEVES Speed Control is easily applied to machines in service. Write for copy of 96-page catalog I-450.

COLUMBUS, INDIANA REEVES PULLEY COMPANY



Typical Example — 24" x 7' bed Engine Lathe, manufactured by Boye & Emme standardly equipped with the REEVES Motodrive for complete speed adjustability. Installation provides any speed over a range of 3.5 to 301 r.p.m. Said one user of this equipment, "Even one r.p.m. of speed adjustment gives more output."



VARIABLE SPEED TRANSMISSION for infinite speed adjustability over wide range of speed ratios, 2:1 to 16:1. In sizes to 87 h.p.



VARI-SPEED MOTOR PULLEY converts any standard constant speed motor to variable speed. Sizes to 15 h.p. Speed ratios within 4:1.



accurate Variable Gives the Right Speed for Every Job!

Shelp Pittsburgh, Chicago, Youngsto Coatesville, Pa., Sparrows Point, Md. Grooved, universal and sheared (No. 5 to 9/82 (m.) Pittsburgh, Chicago, Cleveland... Woroester, Mass............ Birmingham San Francisco 9/32 in. to 47/64 in., 0.15c. a lb. er. Quantity extras apply. Shell Steel Per Gross Ton\$52.0054.0056.00

RAILS, TRACK SUPPLIES

(F.o.b. Mell)
Standard rails, heavier than 60 lb., Nu. 1 O.H., gross ton \$43.00
Angle spilce bars, 100 lb 2.70
(F.o.b. Basing Points) Per Gross Ton
Light rails (from billets)\$46.00
Light rails (from rall steel) 44.60
Base per Lb.
Cut spikes 8.860.
Screw apikes 5.40c.
Tie plate, steel 2.300.
Tie plates, Pacific Coast 3.45c.
Track bolts 4.750.
Track bolts, heat treated, to rail-
roads 5.00c.
Track bolts, jobbers discount 63-5
Basing points, light rails, Pittsburgh,

Chicago, Birmingham; cut spikes and the plates—Pittsburgh, Chicago, Portsmouth. Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond Oregon and Washington ports, add 25c.

TOOL STEEL

(F.o.b. Pi	ttaburah.	Bet	hlah	-	Starr	OCHAS.
*Also Can	tox. ().)		SERVE	B	0.86	per Ib.
High speed						
Straight n	nolyhdens	1990				540.
Tungsten-	molyhden	um		***		57140
High-carbo	nn-chrom	In ma				430
Oil harder	ning*	WARE .				240.
Special ca	rhon*					220
Extra car	bon *				-	180
Regular ca						
	use price					
are 20. a	Ih highe	B . A	1207	00	M Lane	desipp
to blober	the me	and the	00.0	OF .	MA PERS	tron h.

WIRE PRODUCTS

the trade, f.o.b. Pittsburgh, Chicago, Oleveland, Birmingham, Duluth

B	asing	Coast
A to be more than the contract of the contract	ounts	Baemp
N	amed	Pomist
	Base p	er Keg
Standard wire nalls !	2.90	\$3.40
Coated nails	2.90	3.40
Cut nails, carloads	3.85	****
		r 100 Lb.
Annealed fence wire	3.05	\$3.55
Annealed galv. fence wire	3.40	3.90
		Column
Woven wire fence*	67	86
Fence posts, carloads	69	86
Single loop bale ties.	66	91
Galvanized barbed wire**		88
Twisted barbless wire	72	

..On 80-red switching or trans

Management of the last

PRODUCTS

For Containers and Closures

- CHOT DIPPED TIN PLATE
- · ELECTROLYTIC TIN PLATE

· SPECIAL COATED MANUFACTURING TERNES . BLACK PLATE

J<IN MILL PRODUCTS bring ease and economy to all your fabrication . . . for they possess in abundance the qualities that make for quality in your products:

- CONSISTENCY IN FORMING AND SHAPING
- UNIFORM GAUGE
- . UNIFORM TIN AND TERNE PLATING
- · SUPERIOR FINISH affording excellent adhesion which permits faithful reproduction of painted, decal or lithographed designs.

JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH 30, PENNSYLVANIA

THE IRON AGE, October 4, 1945-173

WAREHOUSE PRICES

Delivered metropolitan areas per 100 lb. These are zoned warehouse prices in conformance with latest zoning amendment to OPA Price Schedule 49.

40	SHEETS			STRIP				BA	RS	ALLOY BARS			
Cities	Hot Rolled (10 gage)	Cold Rolled	Galvanized (24 gage)	Hot Rolled	Cold Rolled	Plates 1/4 in, and heavier	Structural Shapes	Hot Rolled	Cold Finished	Hot Rolled, NE 8617-20	Hot Rolled, NE 9442-45 Ann,	Cold Drawn, NE 8617-20	Cold Drawn, NE 9442-4 Ann.
Philadelphia New York Beston Baltimere. Nortolk. Chicago Milwaukee. Cleveland. Buffale: Doirelt Clincianaff St. Louis Pittsburgh St. Paul Ornaha Indianapolia Birmingham Memphia How Orleans How Orleans San Francisco Seattle Portiant Sait Late City	\$3.518 3.59 3.744 3.394 3.771 3.25 3.387 3.35 3.425 3.397 3.35 3.425 3.397 3.50 3.9857 4.058° 3.763 5.00 4.5514 4.6512 4.6512 4.6514 4.6514 4.6514	\$4.672\$ 4.6133 4.744 4.652 4.965 4.20 4.3373 4.40 4.575 4.3473 4.46 5.443 4.568 5.079 5.7.203 7.304 6.604	\$4.768a 5.110 5.2249 4.884 5.371 5.2731 5.2724 4.774 4.775 5.004 4.8255 5.1724 4.75 5.2574 8.0004 4.918 4.75 5.358 6.3133 6.104 6.354 5.754 6.754	\$3.922 3.9746 4.106 3.902 4.185 3.60 3.737 3.50 3.707 3.819 3.707 3.819 3.707 3.819 3.707 4.218 4.218 4.313 4.313 4.313 4.514 4.514 4.513 4.515 4.515 4.516 4.	\$4.772 4.772 4.772 4.775 4.885 4.885 4.8817 4.78717 4.48 4.65917 4.711 4.93117 4.45 5.10217 4.741	\$3.005 \$788 \$712 3.594 3.971 3.65 3.691 3.691 3.40 3.3691 3.40 3.41 4.105	\$3.668 3 758 3 912 3.759 4.002 3.55 3.588 3.661 3.697 3.897 3.40 3.8113 4.168 4.158 4.158 4.158 4.451 4.451 4.451 4.451	33.822 33.853 4 044.065 3.50 3.50 3.53 3.61 3.61 3.61 3.61 3.61 3.61 4.115 4.1	\$4.172 4.203 4.244.152 4.265 3.967 3.85 3.967 3.85 3.96 4.111 4.131 3.85 3.461 4.543 4.543 4.53 4.729 6.473 5.683 5.683	\$5.816 5.858 6.012 5.90 5.837 5.808 5.60 5.93 5.95 5.96 5.94 5.93 7.223 8.204 8.304	\$6.886 6.908 7.062 6.85 6.85 6.85 6.98 7.00 7.031 8.85 5.99 8.98 8.323 9.404 9.404 9.404	\$7.072 7 103 7,194 8 65 8.887 6.65 6.65 6.7011 7 031 6 65 7.381 6.98 8.323 9.304 9.404 8.304	\$8.172 8.203 8.394 7.90 7.987 7.75 7.75 8.059 8.261 8.131 7.90 8.461 8.23 9.373 10.454 10.454

National Emergency Steels MILL EXTRAS

	Basic Op	en-Hearth	Electric	Furnace		Basic Op	n-Hearth	Electric	Furnace
Designa- tion	Bare and Bar-Strip	Billets, Bicoms, and Slabs	Bars and Bar-Strip	Billets, Blooms, and Slabs	Designa- tion	Bars and Bar-Strip	Billets, Blooms, and Slabs	Bars and Bar-Strip	Billets, Bleems, and Slabs
NE 8612 NE 8618 NE 8617- NE 8620 NE 8622 NE 8627 NE 8630 NE 8630 NE 8637 NE 8637 NE 8637	0.65¢ 0.65 0.65 0.65 0.65 0.65 0.65 0.65 0.65	\$13.00 13.00 13.00 13.00 13.00 13.00 13.00 13.00 13.00 13.00	\$1.15 1.15 1.15 1.15 1.15 1.15 1.15 1.15	\$23.00 23.00 23.00 23.00 23.00 23.00 23.00 23.00 23.00 23.00	NE 9427 NE 9430 NE 9432 NE 9435 NE 9437 NE 9440 NE 9442 NE 9445 NE 9447 NE 9450	0.75¢ 0.75 0.75 0.75 0.75 0.75 0.80 0.80 0.80	\$15.00 15.09 15.00 15.00 15.00 16.00 16.00 16.00	\$1.25 1.25 1.25 1.25 1.25 1.30 1.30 1.30	\$25.00 25.00 25.00 25.00 25.00 25.00 26.00 26.00 26.00
NE 8642 NE 8642 NE 8645 NE 8647 NE 8650	0.65 0.65 0.65 0.85 0.85	13,00 13,00 13,00 13,00 13,00	1.15 1.15 1.15 1.16 1.16	23.00 23.00 23.00 23.00 23.00	NE 9722 NE 9727 NE 9732 NE 9737 NE 9742 NE 9745	0.65 0.65 0.65 0.65 0.68 0.65	13.00 13.00 13.00 13.00 13.00 13.00	1.15 1.15 1.15 1.15 1.15 1.15	23.00 23.00 23.00 23.00 23.00 23.00
NE 8712 NE 8716 NE 8717 NE 8720 NE 8722	0.70 0.70 0.70 0.70 0.70	14.00 14.00 14.00 14.00 14.00	1.20 1.26 1.20 1.20 1.20	24.00 24.00 24.00 24.00 24.00	NE 9747 NE 9760 NE 9763 NE 9768	0.65 0.65 0.65 0.65	13.00 13.00 13.00 13.00	1.15 1.15 1.15 1.15	23.00 23.00 23.00 23.00
NE 8725 NE 8730 NE 8730 NE 8735 NE 8735 NE 8740 NE 8740 NE 8745 NE 8747 NE 8747	0.76 0.70 0.70 0.70 0.70 0.70 0.70 0.70	14.00 14.00 14.00 14.00 14.00 14.00 14.00 14.00 14.00	1.20 1.20 1.20 1.20 1.20 1.20 1.20 1.20	24,00 24,00 24,00 24,00 24,00 24,00 24,00 24,00 24,00 24,00	NE 9830 NE 9832 NE 9836 NE 9840 NE 9842 NE 9845 NE 9847 NE 9850	1.30 1.30 1.30 1.30 1.30 1.30 1.30 1.30	26.00 26.00 28.00 26.00 26.00 26.00 26.00 26.00	1.80 1.80 1.80 1.80 1.80 1.80 1.80	36.00 36.00 36.00 36.00 36.00 36.00 38.00 38.00
NE 9415 NE 9417 NE 9420 NE 9422 NE 9428	0.75 9.75 0.78 0.78 0.78	15.00 15.00 15.00 18.00 18.00	1.25 1.25 1.25 1.25 1.25	25.00 25.00 25.00 25.00 25.00	NE 9912 NE 9915 NE 9917 NE 9920 NE 9922 NE 9925	1.20 1.20 1.20 1.20 1.20 1.20	24.00 24.00 24.00 24.00 24.00 24.00	1.55 1.55 1.58 1.58 1.56 1.56	31.0 31.0 31.0 31.0 31.0

Note 1: The ranges shown are restricted to sizes 100 sq. in. or less or equivalent cross-sectional area 18 in. wide or under with a maximum individual piece weight of 7000 lb. irrespective of size. Note 2: For steels ordered to such ranges, below the size 7000 lb. irrespective of size. Note 2: For steels ordered to such ranges, below the size and weight restriction, the average of all the chemical checks must be within the limits specified subject to check analysis variations given in Table 4, Section 10, AISI Steel Products Manual. Note 3: When acid open-hearth is specified and acceptable, add to basic open-hearth alloy differential 0.25c. per lb. for bars and bar strip and 35 per gross ton for billets, blooms and slabs. Note 4: The extras shown are in addition to the base price of \$2.70 for 100 lb. on finished products and \$54 per gross ton on semi-finished steel, major basing points, and are in cents per pound when applicable to bars and bar-strip and in dollars per gross ton when applicable to billets, blooms and slabs. The full extra-applicable over the base price is the total of all extras indicated by the specific requirements of the order. The higher extra shall be charged for any size falling between two published extras.

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD ROLLED: Sheets, 400 to 1499 lb.; strip, extras on all quantities; bars, 1800 lb.base.

NE ALLOY BARS: 1000 to 89,999 Ib.

NE ALLOY BARS: 1000 to 89,990 lb.

EXCEPTIONS: (1) 150 to 499 lb. (2) 150 to 1499 lb. (3) 400 to 1499 lb. (4) 450 to 1499 lb. (4) 450 to 1499 lb. (6) 0 to 199 lb. (7) 400 to 1499 lb. (8) 0 to 1999 lb. (7) 400 to 1499 lb. (8) 1000 to 1999 lb. (8) 500 to 4999 lb. (12) 300 to 19,000 lb. (13) 400 to 14,999 lb. (14) 400 lb. and over. (15) 1000 lb. and over. (16) 1500 lb. and over. (17) 2000 lb. and over. (18) 3500 lb. and over. (19) Philadelphia: Galvanised sheet, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

*Add 0.271c. for sixes not rolled in Birming-

ham.

Octy of Philadelphia only Applicable
freight rates must be added to basing point
prices to obtain delivered price to other localities in metropolitan area.

LAKE SUPERIOR ORES

(51.50% Fe. Natural Content, Delivered Lower Lake Ports*)

Per Gross Ton

FLUORSPAR

Maximum price f.o.b. consumer's plan 230 per short ton plus either (1) rail freis from producer to sonsumer, or (2) rail freis from Rosiclare, Ill., to consumer, whichever

Exception

When the WPB Steel Division certifies in writing the consumer's need for one of the higher grades of metallurateal fluorspar specified in the table below the price shall be taken from the table plus items (1 and 2) from paragraph above.

Effective CaF, Content:	Base price per short ton
70% or more	\$33.00 \$2.00
60% but less than 65%	31.00

FOR CLOSE LIMITS-Blanchardize



.23

livered

The Blanchard No. 18 Surface Grinder is used to rough and finish-grind these oil burner parts, and .012" of stock is ground off one side to limits of +.0003" -.0001". (48 per hour)



Eighteen of these cast iron ball bearing spacers, with eighteen smaller spacers inside of them are ground to limits of .0002" after removing .925" of stock. (144 surfaces per hour)



This is an excellent example of accurate surface grinding of pump body parts on a No. 18 Blanchard Surface Grinder. The material is high strength forged steel and .004" of stock is removed from each side to limits of ±.0003". (80 surfaces per hour)



These heat-treated steel trunnion bearings are ground on a No. 16-A2 Blanchard Surface Grinder. They are ground to limits of ±.0005" after removing .005" to .015" of stock. (2315 per hour)



Send for your free copy of "Work Done on the Blanchard", third edition. This new book shows over 100 actual jobs where the Blanchard Principle is earning profits for Blanchard owners.



The BLANCHARD MACHINE COMPANY

64 STATE STREET, CAMBRIDGE 39, MASS., U. S. A.



WELDED PIPE AND TUBING

Base discounts, f.o.b. Pittsburgh and Lorain, Ohio, mills (F.o.b. Pittsburgh only on wo base price-\$200.00 per

Steel (buttweld)		
¼-in. %-in. 1-in. to 3-in.	Black 63 ¼ 66 ¼ 68 ¼	67 %
Wrought Iron (buttwold)		
½-in. ¾-in. 1-in. and 1½-in. 1½-in. 2-in.	34 30 34 28 3736	10 16 1814 1814
Steel (lapweld)		
2-in. 2 1/4-in. and 3-in	61 64 66	49 14 59 14 54 14
Wrought Iron (lapweld)		
2-in. 2 ½-in. to 3 ½-in. 4-in. 4 ½-in. to 8-in.	30 14 31 14 31 14 32 14	18 144 18 17
Steel (butt, extra strong,	plain e	nda)
%-in. %-in. 1-in. to 3-in.	61 16 65 16 67	8014 8412 57
Wrought Iron (same as	above)	
%-in. %-in. 1-in. to 2-in.	36 81 38	18%
Steel (lap, extra strong, p	lain on	de)
2-in. 214-in. and 3-in. 312-in. to 6-in.	69 63 66 %	40 16 50 %
Wrought Iron (same as a	bove)	dr.tecanom
2-in. 214-in. to 4-in. 412-in. to 6-in.	33 1/4 39 37 1/4	18 1/2 22 1/6 21
On buttweld and lapwe jobbers are granted a disco	old stee	5 pet.
On Lc.l. shipments prices a by adding 25 pct and 30 carload freight rate to the F.o.b. Gary prices are two	pet ar	nd the
F.o.b. Gary prices are two	o points	lower Pitts-
burgh or Lorain on laps point lower discount, or \$2 on all buttweld.	veld an	d one

CAST IRON WATER PIPE

6-in. and larger, del'd Chicago...\$5.6-in. and larger, del'd New York...\$5.6-in. and larger, del'd New York...\$5.6-in. and larger flow. Angeles.....\$6.6-in. and larger flow. Angeles.....\$6.6-in. and larger flow. Cars, Seattle. 71. Class "A" and gas pipe, \$3 extra; 4-pipe is \$3 a ton above 6-in. Prices sho are for lots of less than 200 tons. I 200 tons or over, 6-in. and larger \$45 at Birmingham and \$53.80 deliver Chicago, \$59.40 at San Francisco a Los Angeles, and \$70.20 at Seattle. I livered prices do not reflect 3 pct tax freight rates.

BOILER TUBES

Seamless steel and lapweld oo boiler tubes and locomotive tub imum wall. Net base grices pe f.o.b. Pittsburgh, in carload

	Begi	mless	weld,
	Cold-	Hot-	Hot-
	Drawa	Rolled .	Rolled
2 In. O.D. 13 B.W.G.		13.04	12.38
3% in. O.D. 12 B.W.G.		17.54	16.58
8 tn. Q.D. 12 B.W.G.		19.50	
3 1 in. O.D. 11 B.W.G.	28.37	24.62	23.15
4 in. O.D. 10 B.W.G.	35.20	30.54	28.66
(Batras for less o	arload	quantit	ica)
40,000 % or ft and	over		Base
39,000 lb or ft to 39,	999 Ib	or ft	5 pet
20,000 lb or ft to 29,1			
10,000 lb or ft to 19,			
5,000 lb or ft to 9,1	999 Ib	OF St	36 pet
2,000 lb or ft or 4,	996 IP	or st	45 pot
Under 2,000 lb or ft			05 pet

Corrosion and Heat Resisting Steel

(Base price, cents per pound, at points indicated: P—Pittsburgh; Ch—Chicago; Cl—Cleveland; C—Canton; M—Middletown, O.; Sy—Syracuse; D—Dunkirk; W—Watervillet; N—Newark, N. J.; B—Baltimore; R—Reading; Y—Youngstown; F—Ft. Wayne; P—Philadelphia)

Chromium-Nickel Alloys

	No. 304	No. 302
Ingot, P,Ch,C,B,R Y	Subject to	negotiation
Blooms, P.Ch.C.R.Y	21.25	20.40
Slabs, P,Ch,C,B,R.Y	21.25	20.40
Billets, P.Ch.C.N.W.Sy.B	Subject to	negotiation
Billets, forging, P.Ch.C.D.B.R.Y.		20 40
Bars, h-r.P.Ch.C.D.W.N.Sy.B.R.F		24.00
Bars. c-f.P.Ch.Cl.C.M.D.N.Sv.B.		
R,F Plates, P,M Shapes, structural, P,Ch Sheets, P,Ch,M,C	25.00	24.00
Plates, P.M.	29.00	27.00
Shapes, structural, P.Ch	25.00	24.00
Sheets, P.Ch.M.C	36.00	34.00
Strip, h-r, P, Ch, R, C.Y	23 50	21.50
Strin c-r PCINRCY	30 00	28.00
Wire, e-d. Cl.D.Sv.B.R.C.	25.00	24.00
Wire. flat, c-r,Cl,B	30.00	28.00
Rod, h-r,N,Sy	25.00	24.00
Tubing, seamness, P.Ch.C		12 - 2477
(4 in. to 6 in.)		66.63

Straight Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
Ingot, P,Ch,C,B,R Y		ject to	negotia	
Blooms, P,Ch,C,R Y	15.725			23.375
Slabs, P,Ch,C,B,R,Y Billets, P,Ch,C,N,W,	15.725	16.15	19.125	23.375
Sy,B. Billets, forging, P.Ch.	Sub	ject to	negotia	tion
C.D.B.R.Y	15.725	16.15	19.125	23.375
Bars, h-r,P,Ch,C,D,W, N,Sy,B,R,F	18:50	19.00	22.50	27.50
Bare, c-f,P,Cb,Cl,C,M, D,N,Sy,B,R,F	18.50	19.00	22.50	27.50
Plates, P.M	21.50	22.00	26.50	30.50
Shapes, structural, P,Ch	18.50	19.00	22.50	27.50
Sheets, P,Ch,M,C	26.50	29.00	32.50	36.50
Strip, h-r, P, Ch, R, Y C		17.50	24.00	35.00
Strip, c-r,P,Cl,N,R,Y,C.		22.50	32.00	52.00
Wire, c-d, Cl, D, Sy, B, R, C		19.00	22.50	27.50
Wire, flat, c-r,Cl,B		22.50	32.00	52.00 27.50
Rod, h-r,N,Sy	18.50	19.00	22.50	24.00
Tubing, seamless, P,Ch,C (4 in. to 6 in.)		63.30		
		The same of		

Chromium-Nickel Clad Steel (20%)

																										ï	304 18.00 19.00	
*Inch	20	le	18	ï	g	L	21	21	N.	Ň	H	n	æ	ď.	8	LE.	id	í	1	ol	le	á	d	ħ	ni	E.		

EXCEPTIONS TO RPS 6

Ingots, carbon, rerolling—Phoenis Iron Co. may charge \$38.75; Kaiser Co., \$43.00 f.o.b. Pacific Coast ports; Empire Sheet & Tinplate Co., \$34.25; Pgh. Steel Co., \$33.10. Granite City Steel, \$39.45. Ingots, carbon, forging—Phoenix Iron Co. may charge \$43.00; Empire Sheet & Tinplate Co., \$39.25, f.o.b. Mansfield, Ohio; West Coast producers, \$48.00, f.o.b. Pacific Coast Ports; Pgh. Steel Co., \$38.10. Ingots, alloy—C/1 delivered, Detroit

\$38.10.
Ingots, alloy—C/l delivered Detroit add \$2.00; delivered East Michigan add \$3.00. Connors Steel Co. may charge \$45.00 f.o.b. Birmingham.
Slabs, per gross ton—Andrews Steel Co. \$41 basing pts.; Wheeling Steel Corp. (rerolling) 4 in. sq. or larger \$37.75 f.o.b. Portsmouth, Ohio; Empire Sheet & Tin Plate Corp. \$41; Phoenix Iron Co. (rerolling) \$41, (forging) \$47; Granite City Steel \$47.50; Kalser Co., (rerolling) \$58.64, (forging) \$64.64, f.o.b. Los Angeles.

\$58.64, (forging) \$64.64, f.o.b. Los Angeles.
Blooms, per gross ton—Phoenix Iron
Co. (rerolling) \$41; (forging) \$47; Pgh.
Steel Co. (rerolling) \$38.25, (forging) \$44.25; Wheeling Steel Corp. (rerolling) 4 in. sq. or larger \$37.75 f.o.b. Portsmouth; Kaiser Co. (rerolling) \$58.64, (forging) \$64.64 (shell steel) \$74.64 (o.b. Los Angeles.
Sheet Bar, per gross ton—Empire Sheet & Tinplate Co. \$39 mill; Wheeling Steel Corp. \$38 Portsmouth, Ohio.
Billets, Forging, per gross ton—Andrews Steel Co. \$60 basing pts; Follansbee Steel Corp. \$49.50 Toronto, Ohio; Phoenix Iron Co. \$47 mill; Geneva Steel Co. \$64.64 f.o.b. Pacific Coast; Pittsburgh Steel Co. \$49.50; Kaiser Co. \$64.64, (shell steel) \$74.64, f.o.b. Los Angeles.



LOWER PRODUCTION COSTS



The Weldit Gasaver shuts off the welding flame when not in use. . . . Conserves essential materials by cutting oxygen and acetylene consumption as much as fifty per cent. Prevents injury to workmen-or sudden fires-from dangerous idle torch flames. . . . Adjustment remains unaltered between welds.

When the Weldit Gasaver has been installed, you simply hang idle torch on the handy lever rod. Weight of torch pulls rod down, thus automatically shutting off supply lines. Relight instantly by passing torch over Gasaver pilot light. No bother. . . . No time lost. . . . No readjusting required. . . . Price \$10.00 at Detroit. Order today.

Better Soldering, Annealing and Heating Jobs

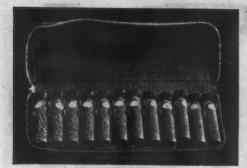


TORCH

The Weldit Model CW Blowpipe is in daily use by many foremost industrial plants. . . . Built in accordance with the recommendations of leading fabricators of sheet metal products. . . . Operates on

either natural gas, manufactured gas, or other low temperature fuel gas and compressed air. Stands up under rough shop use. . Send for literature.

ELDIT ACETYLENE 641 BAGLEY AVENUE . DETROIT 26, MICH.



A shot or grit that will blast fast with a clean finish.

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

The unprecedented demand for our-

We manufacture shot and grit for endurance

Heat-Treated Steel Shot and Heat-Treated Steel Grit

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.



HARRISON ABRASIVE CORPORATION

Manchester, New Hampshire

HEAT-TREATED STEEL GRIT

REVOLVATOR PORTABLE ELEVATORS

Lower Your Costs for Material Handling

Whether or not you have reconversion problems now is the time to install more efficient and economical material handling equipment. That means REVOLVATOR (Reg. U. S. Pat. Off.) PORTABLE BLEVATORS and RED GIANT LIFTRUCKS. The two work together to save you much time, labor, and space for all piling, stacking and moving. Other models for servicing high ceilings, press feeding, etc.

Write or phone us your requirements and we will send appropriate bulletins.



RED GIANT LIFTRUCKS have Timken Roller Bearings as standard equipment. Send for folder.



103 NMT 24—Telescopic REVOLVATOR for piling close to the ceiling between roof trusses.

REVOLVATOR CO.

DESIGNERS AND MANUFACTURERS OF MATERIAL HANDLING EQUIPMENT

387 86th STREET

NORTH BERGEN, N. J.

Since 1904

Billets, Rerolling, per gross ton—Continental Steel Corp. may charge Acme Steel in Chicago switching area \$34 plus freight from Kokomo, Ind.; Northwestern Steel & Wire Co. (Lend-Lease) \$41 mill; Wheeling Steel Curp. 4 in sq. or larger \$37.75, smaller \$39.50 f.o.b. Fortsmouth, Ohio; Stanley Works may sell Washurn Wire Co. under allocation at \$39 bridgeport, Conn.; Keystone Steel & Wire Co. may sell Acme Steel Co. at \$39 base, f.o.b. Peoria; Phoenix Iron Co. \$41 mill; Continental Steel Corp. (1½, x 1½,) \$39.50, (2 x 2) \$40.60 Kokomo, Ind. (these prices include \$1 size extra); Keystone Steel & Wire Co. \$36.40 Peoria; Connors Steel Co. \$50.60 Birmingham; Ford Motor Co. \$34 Dearborn, Mich.; Geneva Steel Co. \$48.50; Kaiser Co. \$58.64 f.o.b. Pacific Coast; Pgh. Steel Co. \$48.50; Kaiser Co. \$58.64 f.o.b. Los Angeles.

Structural Shapes—Phoenix Iron Co. 2.35c.

Structural Shapes—Phoenix Iron Co. 2.35c. basing pts. (export) 2.50c. Phoenixville; Knoxville Iron Co. 2.30c. basing points; Kaiser Co. 3.20c. f.o.b. Los Angeles.

Ralis, per gross ton—Sweet Steel Co. (rail steel) \$50 mill; West Virginia Rail Co. (lightweight) on allocation based Huntington, W. Va.; Colorado Fuel & Iron, \$45 Pueblo.

Hot Rolled Plate—Granite City Steel Co. 2.88c. produced on DPC cupt., 2.86c. otherwise; Knoxville Iron Co. 2.26c. basing pts.; Kaiser Co. and Geneva Steel Co. 3.20c. Pacific Ports; Central Iron and Steel Co. 2.50c. basing points; Granite City Steel Co. 2.88c. Granite City.

2.35c. Grante Chy.

Merchant Bars—W. Ames Co., 10 tons and over, 2.85c. mill; Eckels-Nye Steel Corp. 2.50c. basing pts. (rail steel) 2.40c.; Phoenix Iron Co. 2.40c. basing pts.; Sweet Steel Co. (rail steel) 2.35c. mill; Joslyn Mfg. & Supply Co., 2.35c. Chicago; Calumet Steel Div., Borg Warner Corp. (8 in. mill bar), 2.56c. Chicago; Knoxville Iron Co., 2.30c. basing pts.; Lacled Steel Co., sales to LaSalle Steel granted Chicago base, f.ob Madison, Ill.; Milton Mfg. Co., 2.75c. f.ob. Milton, Ps.

Pipe Skelp—Wheeling Steel, Benwood, 2.05c. Relaforcing Bars—W. Ames & Co., 10 tons and over, 2.85c. mill; Sweet Steel Co. (rali steel), 2.38c. mill; Columbia Steel Co., 2.85c. Pacific Ports.

Pacific Ports.

Cold Finished Bars—Keystone Drawn Steel Co. on allocation, Pittsburgh e.f. base plus c/1 freight on hot rolled bars Pittsburgh to Spring City, Pa.; New England Drawn Steel Co. on allocation outside New England, Bufalo e.f. base plus c/1 freight Buffalo to Mansfield, Mass., f.o.b. Mansfield; Empire Finished Steel Corp. on allocation outside New England, Buffalo e.f. base plus c/1 freight Buffalo to plants, f.o.b. plant; Compressed Steel Shafting Co. on allocation outside New England, Buffalo base plus c/1 freight Buffalo to Readville, Mass., f.o.b. Readville; Medart Co. in certain areas, Chicago c.f. base plus c/1 freight Chicago to St. Louis, f.o.b. St. Louis.

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Alloy Bare—Texas Steel Co., for delivery except Texas and Okla., Chicago base, f.o.b. Fort Worth, Tex.; Connors Steel Co., shipped outside Ala., Mississippi, Louisiana, Georgia, Florida, Tenn., Pittsburgh base, f.o.b. Birmingham.

Hot Rolled Strip—Joslyn Mfg. & Supply Co., 2.30c. Chicago; Knoxville Iron Co., 2.25c. basing pts.

Hot Rolled Sheets—Andrews Steel Co., Middletown base on shipments to Detroit or ares: Parkersburg Iron & Steel, 2.25c. Parkersburg. Granite City Steel 2.43c.

Galvanised Sheets—Andrews Steel Co. 3.75c. basing pts.; Parkersburg Iron & Steel Co. 3.85c. Parkersburg; Continental Steel Co. Middletown base on Kokomo, Ind., product; Superior Sheet Steel Co., Pittsburgh base except for Lend-Lease.

Pipe and Tubing—South Chester Tube Co. when priced at Pittsburgh, freight to Gulf Coast and Pacific Ports may be charged from Chester, Pa., also to points lying west of Harrisburg, Pa.

Black Sheets—Empire Sheet and Tinplate Co., maximum base price mill is 2.45c. per 100 lb., with differentials, transportation charges, etc., provided in RPS. No. 6.

Wire Products—Pittaburgh Steel Co., f.c.b. Pittaburgh, per 100 lb., rods, No. 5 to 9/83 in., 2.20c.; rods. heavier than 9/82, 2.56c; bright wire, 2.725c.; bright nails, 2.90c.; lead and furnace anocaled wire, 2.85c.; pot annealed wire, 2.85c.; galvanized barbed wire, 3.90c.; plain staples, 2.55c.; galvanized staples, 2.65c.; bright spring wire, 3.80c.; galvanized suring wire, 3.46c.

BASING POINT BASE PRICES DELIVERED PRICEST (BASE GRADES) No. 2 Foundry Basin Basic \$25.50 25.50 20.00 24.00 24.50 24.50 25.00 24.50 24.50 24.50 24.50 24.50 24.50 24.50 24.50 24.50 24.50 24.50 24.50 24.50 24.50 \$26.00 26.00 21.38 25.00 25.00 25.00 25.00 26.60 26.00 26.00 26.00 25.00 25.00 25.00 25.00 25.00 \$26.50 26.50 \$27.00 27.00 26.00 26.00 25.50 25.50 26.00 27.00 25.50 \$28,00 \$26.50 \$27.00 \$27.50 Birdsbero Birmingham Buffalo Chicago Cleveland \$30.50 breaklyn.
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Birdsboro...
Provo...
Buffalo...
Cleveland &
Buffalo...
Swedeland
Birdsboro...
Provo...
Buffalo... 27.48 27.98 Hamilton.... Noville Island 28.50 28.44 29.94 27.44 26,94 25.50 25.00 3.36 .84 1.24 4.95 15.41 4.98 15.41 26,34 28.84 27.34 27.84 30.50 26.00 25.00 25.00 28.50 25.00 25.00 27.00 25.50 25.60 27.48 27.98 ***** 27.48 27.95 Scattle St. Louis St. Louis

* Maximum per gross ton, established by OPA February 14, 1945.

† Prices do not reflect 3 per cent tax on freight.

Granite City

ntinental Chicago Kokomo, (Lend-p. 4 in. b. Forta-il Wash-Bridge-Co. may s. f.o.b. Continen-(2 x 2) clude \$1 /ire Co. direction of the Co. direction of

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Co. 8.75e. Steel Co., teel Co.,

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Tube Co. to Gulf rged from west of

plate Co., er 100 lb., rges, etc.,

Co., f.o.b. 5 to 9/33 52, 2.35c.; 90c.; lead; pot an-bed wire, ed staples, galvanized

(1) Struthers Iron & Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.
Charcoal pig iron base prices for Lyles, Tenn., and Lake Superior furnaces, \$33.00 and \$34.00, respectively. Newberry Brand of Lake Superior charcoal iron \$39.00 per g.t., t.o.b. furnace, by order L 39 to RPS 10, April 11, 1945, retroactive to March 7, 1945. Delivered to Chicago, \$42.34. High phosphorus iron sells at Lyles, Tenn., at \$28.50.
Basing point prices are subject to switch-

ing charges; Silicon differentials (not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade which is 1.76 to 2.25 per cent); Phosphorus differentials, a reduction of 88c. per ton for phosphorus content of 0.76 per cent and over; Manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent. Effective March 3, 1943, \$2 per ton extra may be charged for 0.5 to 0.75 per cent nickel content and \$1 per ton extra for each additional 0.25 per cent nickel.

Silvery iron and bessemer ferrosilicon up to and including 14.00 per cent silicon covered by RPS 10 as amended Feb. 14, 1945. Silvery iron, silicon 6.00 to 6.50 per cent, C/L per G.T., f.o.b. Jackon, Ohio—\$30.50; f.o.b. Buffalo—\$31.75. Add \$1.00 per ton for each additional 0.50% Si. Add 50c. per ton for each 0.50% Mn over 1.00%. Add \$1.00 per ton for 0.75% or more P. Bessemer ferrosilicon prices are \$1.00 per ton above silvery iron prices of comparable analysis.

28.80

\$34.52

33.42

33.69

34.90

32.44

48.91

33.88

31.74

48.91

48.91

37.57

28.00

METAL POWDERS

*Freight allowed east of Mississippi.

COVE

CORE	
Furnace, beehive (f.e.b. oven) Connellsville, Pa	\$7.50
Faundry, beehive (f.s.b. oven) Fayette Co., W. Va. Connellsville, Pa.	8.10
Chicago, del'd	13.75
New England, del'd	14.65
Kearny, N. J., f.o.b. Philadelphia, del'd Buffalo, del'd	. 13.28
Portsmouth, Ohio, f.o.b.	11.50
Erie, del'd	13.16
Cincinnati, del'd	13.25
Birmingham, del'd	. 10.90

^e Hand drawn ovens using trucked coal permitted to charge \$8.60 per ton plus transportation charges.

ENGINEERING AND METALLURGICAL RESEARCH PRODUCE FINER GEARS AT FAIRFIELD

25.00

7.07

25.50

· Metallurgical developments and engineering research at FAIRFIELD help produce finer gears. Photoelastic studies on plastic gear models provide a simpler, more accurate means of determining gear stresses. FAIR-FIELD'S metallurgical laboratory maintains complete control of materials and heat treat-

Wherever gears are highly stressed or where service conditions are severe, you'll find FAIRFIELD'S engineering and metallurgical developments paying big dividends in long life, freedom from service failures, production economy, and improved gear set efficiencies (see cut above).

Special gears on a production line basis. Write to FAIRFIELD for recommendations on your problems. No obligation, of course.



Fairfield equipped mine shuttle car.

MADE TO ORDER

Hypoid, Helical, Herringbone, Spur, Spiral Bevel, Straight Bevel, Worm and Zerol Gears; also, complete Differentials and various Splined Shafts.



THE IRON AGE, October 4, 1945-179

ERIE BUCKETS



General Purpose Dredging and Hard Digging Dragline **Material Handlers** Hook-on Type Ore Handling Coal and Coke 4-Rope **Barge Type** Strayer Electric

Above types built in weights and capacities to suit your crane and job requirements.

Write for Data

ERIE STEEL CONSTRUCTION CO.

ERIE, PENNSYLVANIA

Aggre Meters . Buckets . Concrete Plants . Traveling Cranes



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PERFORATING

5657 FILLMORE STREET—CHICAGO 44, ILL. Eastern Office, 114 Liberty Street, New York 6, N. Y.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birming-ham or Chicago)

Machine and Carriage Bolts:

Base discount less case lots

4 in. & smaller x	6 in. & shorter 65 4
	in. & shorter 63 %
	& shorter61
	all lengths59
	6 in. long
	65

Nuts, Cold Punched or Hot Pressed

1/2 11	n.	and	81	maller inclusi					è						.1	62
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On above boits and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts U.S.S. S.A.E.

Dase ancount tess ved tota	
7/16 in. and smaller	64
in. and smaller 62	60
½ in. through 1 in 59	60
1% in. through 1% in 57	58
1% in, and larger 56	
In full been lote 10 new comt addit	Sama

Stove Bolts Consu	mer
Packages, nuts loose71 an	
In packages, with nuts attached	
On stove bolts freight allowed up	

65c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over. Large Rivets

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F.o.b.	Pittsbu	irgh.	Ck	97	eli	BI	id	í	1	Ċì	i		20.
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Small Rivets (7/16 in, and smaller)

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ROOFING TERNE PLATE

(F.o.b. Pittsburgh, 112 Sheets)

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			2	0x14 in.	20x28 in.
8-lb.	coating	I.C		\$6.00	\$12.00
15-lb.	coating	I.C		7.00	14.00
20-lb.	coating	I.C		7.50	15.00

ELECTRICAL SHEETS

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ib. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.

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Consumer

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51 per 100 lb. New York

ATE heets) . 20x28 in. \$12.00 14.00 15.00

TS (At Per Lb.
3.30c.
3.65c.
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5.05c.
5.75c.
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7.25c. oc. per 100 i including 5c. per 100 Ferromanganese

Spiegeleisen Maximum base, contract prices, per gross ton, lump, f.o.b. Palmerton, Pa. 16-19% Mn 19-21% Mn 3% max. Si 3% max. Si 3% max. Si 236.00 47.50 48.50

Electric Ferrosilicon

OPA maximum base price cents per lb. contained SI, lump size in carloads, f.o.b. shipping point with freight allowed.

Eastern Central Western Zone Zone

50% SI ... 8.05c. 8.20c. 9.75c.
80-90% SI ... 8.90c. 9.05c. 9.55c.
90-95% SI .11.05c. 11.20c. 11.65c.
Spot sales add: 45c. per lb. for 50% SI. .3c. per lb. for 75% SI. .25c. per lb. for 80-90% and 90-95% SI.

Silvery Iron Silicon 14.01 to 14.50 per cent, \$45.50 per G. T. f.o.b. Jackson, Ohio. Add \$1.00 per ton for each additional 0.50% SI up to and including 18%. Add \$1.00 per ton for low impurities, not to exceed: P-0.05%, S-0.04%, C-1.00%. Covered by MPR 405.

Silicon Metal OPA maximum base price per lb. of contained Si, lump size, f.o.b. shipping point with freight allowed to destination, for l.c.l. above 2000 lb., packed. Add .25c. for spot sales.

Eastern Central Western
Zone Zone Zone
96% St. 2% Fe.. 13.10c. 13.55c. 16.50c,
97% St, 1% Fe.. 13.45c. 13.90c. 16.80c.

Ferrosilicon Briquets
OPA maximum base price per lb. of briquet, bulk, Lo.b. shipping point with freight allowed to destination. Approximately 40% Sl. Add. 25c. for spot sales.

Eastern Central Western Zone Zone Zone Zone Carload, bulk 3.35c. 3.50c. 3.65c. 2000 lb-carload 3.8c. 4.2c. 4.26c.

Ferrochrome

(65-72% Cr. 2% max. 81)

OPA maximum base contract prices per ib. of contained Cr, lump size in carload lots, f.o.b. shipping point, freight allowed to destination. Add .25c. per lb. contained Cr for spot sales.

	-	_		-		•			
						1	Eastern Zone	Central Zone	Western Zone
0.06%	C						23.00c.	23,40c.	34,00c.
0.10%	C						22.50c.	22,90c	23,50c.
0.15%	C					ú	22,00c.	22,40c.	
0.20%	C				91		21.50c.	21.90c.	
0.50%	C						21.00c.	21.40c.	22,00c.
1.00%							20,50c.	20,90c.	
2.00%							19.50c.	19.90c.	21.00c.
66-71%	C			í			197.36		
							13.00c.	13.40c.	14.00c.
62-669	6 C	T.							
5-79	2 6	~	ń				12 50c	13 90c	14.500

High-Nitrogen Ferrochrome
Low-carbon type: 67-73% Cr. 0.75%
N. Add 2c. per lb. to regular low-carbon
'errochrome price schedule. Add 2c. for
sach additional 0.25% N. High-carbon
type: 66-71% Cr. 4-5% C. 0.75% N. Add
sc. per lb. to regular high-carbon ferrohrome price schedule.

contained, lump size, f.o.b. shipping point, freight allowed to destination, Eastern Zone. Add 0.25c. for spot sales.

Carloads, Ton
Bulk Lots

Ton

Bulk Lots Ton

1.10% max. C, 1
or 2% max. Si... 23.00c. 23.40c. 23.65c.

1.15% max. C, 1
or 2% max. Si... 22.00c. 22.40c. 22.65c.

1.30% max. C, 1
or 2% max. C, 1
or 2% max. Si... 21.00c. 21.40c. 21.65c.

1.50% max. C, 1
or 2% max. Si... 20.00c. 20.40c. 20.65c.

1.75% max. C, 1
0.75% max. Si... 16.00c. 16.40c. 16.65c. Ferrochrome Briquets

Contract prices per lb. of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 60 per cent contained chromium. Add 0.25c. for spot sales.

Bastern Central Western Zone Zone Zone Zone Carload, bulk. 8.25c. 8.55c. 8.95c. Ton iots ... 8.75c. 9.25c. 10.75c. Less ton lots. 9.00c. 9.50c. 11.00c.

Ferromanganese Briquets
Contract prices per lb. of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 66 per cent contained manganese. Add 0.25c. for spot sales.

Eastern Central Western Zone Zone Zone Carload, bulk. 6.05c. 6.30c. 6.60c. Ton lots ... 6.65c. 7.55c. 8.55c. Less ton lets. 6.80c. 7.80c. 8.80c.

Calcium—Manganese—Silicon
Contract prices per ib. of alloy, lump
lize, f.o.b. shipping point, freight allowed
to destination.

16-20% Ca, 14-18% Mn, 53-59% Si.
Add 0.25c. for spot sales.

Eastern Central Western
Zone Zone
Carloads ... 15.50c. 16.00c. 13.05c.
Ton lots ... 16.50c. 17.35c. 19.10c.
Less ton lots. 17.00c. 17.35c. 19.60c.

Calcium Metal

Eastern zone contract prices per ib. of metal, f.o.b. shipping point, freight allowed to destination. Add 5c, for spotsales. Add 0.9c, for Central Zone; 0.49c, for Western Zone.

Cast Turnings Distilled Ton lots . . . \$1.80 \$2.30 \$5.00 Less ton lots . . 2.30 \$5.75

Ferroboren
Contract prices per lb. of alloy, f.o.b. shipping point, freight allowed to destination. Add 5c, for spot sales. 17.50% min. B, 1.50% max. Sl, 0.50% max. Al. 0.50% max. C.

0.50% max. C.

Eastern Central Western
Zone Zone Zone
Ton lots \$1.20 \$1.2075 \$1.229
Less ton lots . . 1.30 1.3075 1.329

Manganese—Boron
Contract prices per lb. of alloy, f.o.b.
hipping point, freight charges allowed.
Add 5c. for spot sales.
75.00% Mn, 15-20% B. 5% max. Fe,
1.50% max. Sl, 3.00% max. C.
Eastern
Zone
Zone
Ton lots \$1.89
\$1.903
\$1.935
Less ton lots... 2.01
2.023
2.056

Spot and contract prices per lb. of alloy, f.o.b. shipping point, freight allowed to destination.

15-18% B, 1.00% max. Al, 1.50% max. Sl, 0.50% max. C, 3.00% max. Fe, bal-

ance NL	-	78		
242.	Eastern	Central Zone	Western	
11.200 lb.	125.792			
or more .	. \$1.90	\$1.9125	\$1.9445	
Ton lots	. 2.00	2.09125	2.0448	
Less ton lots	2.10	2.1125	2.1441	

Other Ferroalloys	
Ferrotungsten, Standard grade	
Fefrotungsten, Standard grade lump or 4X down, packed, f.o.b. plant at Niagara Falls, New York, Washington, Pa. York, Pa., per lb. contained tungsten, 10,000 lb, or more	1000
New York, Washington, Pa. York, Pa., per lb. contained	0.3
tungsten, 10,000 lb. or more	\$1.90
Ferrovanadium, 35-55%, contract basis, f.o.b. producer's plant, usual freight allowances, per lb.	
contained va.	
Open hearth	\$2.80
Primos	\$2.90
Cobalt, 97% min., keg packed, contract basis, f.o.b. producer's plant, usual freight allowances,	
per ib. or copait metal	\$1.50
Vanadium pentoxide, 88-92% V ₂ O ₂ technical grade, contract basis, any quantity, per lb. con- tained V ₂ O ₂ . Spot sales add 5c. per lb. contained V ₂ O ₃	
tained V ₂ O ₂ . Spot sales add 5c.	
	\$1.10
producer's plant with usual freight allowances, per lb. of alloy. (Pending OPA approval)	
	250.
ZUUU ID. TO CATIOAG	260.
Silvas No. 2, contract basis, f.o.b. producer's plant with freight al- lowances, per lb. of alloy (Pend- ing OPA approval)	
ing OPA approval)	
2000 lb. to carload	58c. 59c.
Grainal, f.o.b. Bridgeville, Pa., freight allowed 50 lb. and over, max. based on rate to St. Louis	
	87.5c.
No. 6 No. 79	60c. 45c.
No. 6 No. 79 Bortram, f.o.b. Niagara Falls Ton lots, per lb. Less ton lots, per lb.	45c.
Less ton lots, per lb	50c.
basis, f.o.b. plant with freight	
allowances, per 10, contained CD.	\$2.25
2000 lb, lots	\$2.30
Ferrotitanium, 40-45%, 0.10%C. max. f.o.b. Niagara Falls, N. I., ton lots, per lb. contained Ti Less ton lots.	\$1.53 \$1.25
Less ton lots	\$1.25
Ferrotitanium, 20-25%, 0.10%C. max, ton lots, per lb. contained titanium	21.85
Less ton lots	\$1.55
10%, 6-8% carbon, contract	
10%; 6-8% carbon, contract basis, f.o.b. Niagara Falls, N. Y. freight allowed East of Missis- sippi River, north of Baltimore	
and Mr. Louis, Der Cariomis	142.60
Ferrophosphorus, 18% electric or blast furnaces, f.o.b. Anniaton, Ala., carlots, with \$3 unitage freight equalled with Rockdale, Tenn., per gross ton	
freight equalled with Rockdale.	
Ferrophosphorus, electrolytic 23-	68.50
26%, carlots, f.o.b. Monsanto (Siglo), Tenn., \$3 unitage freight	
Ferrophosphorus, electrolytic 23- 26%, carlots, f.o.b. Monaanto (Siglo), Tenn., \$3 unitage freight equalized with Nashville, per gross ton	\$75.00
Ferromolybdenum, 55-75%, 1.0.b.	
quantity, per lb. contained Mo.	950.
Calcium molybdate, 40-45%, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained	
MO	800.
Molybdenum oxide briquets, 48- 52% Mo. f.ob. Langeloth, Pa. per lb. contained Mo	800.
Molybdenum oxide, in cans, Lo.b	900.
Molybdenum oxide, in cans, f.o.b Langeloth and Washington, Pa. per lb. contained Mo	80c.
Zirconium, 35-40%, contract basis, f.o.b. producer's plant with	
Zirconium, 35-40%, contract basis, f.o.b. producer's plant with freight allowances, per lb, of alloy. Add %c. for spot sales	E
Carload lots	140.
lump f.o.b. plant usual freight allowances, per lb. of alloy Carload, bulk	1
Aleifar (approx. 20% Al. 40% SI	4.60
and 40% Fe), contract basis, f.o.b. Niagara Falls, carload.	
Ton lots	5.75c. 7.25c.
Simanal (approx. 20% Si. 20%	
Simanal (approx. 20% Sl. 20% Mn. 20% Al), contract basis, f.o.b, Philo. Onio, with freight not to exceed St. Louis rate al-	
Car lots	8.00a
Ton lots	8.75c. 9.25c.

S-M-0-Q-T-HORMANCE...



New Powerful Rust Preventives...

Engineered for Easy Application



These new Tycol Rust
Preventives solve the
problem of rust prevention on: stock in storage,
parts in production, and
machinery standing in
warehouses awaiting
reconversion.
Engineered expressly

Engineered explosions to meet U. S. Army and Navy specifications, their low viscosity and low pour lend themselves to applications — down to 50° F — by spraying, brushing, cations — down to 50° F — by spraying, brushing, swabbing or dipping. Compounded from the finest swabbing or dipping. Compounded from the finest mineral oil base, Tycol NO-RUST-OLS do not dry mineral oil base, Tycol NO-RUST-OLS do not dry to a wax-like coating, thus they can be removed by a simple degreasing operation.

If moisture is present — whether from indoor storage, or mild "sweating" during factory handstorage, or write your nearest Tide Water Associated ling, call or write your nearest about the "rust protection" afforded by Tycol NO-RUST-OLS.



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BOSTON - PHILABELPHIA
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IRIDITE Shuts Out Corrosion, Provides Firm Paint Base, too

G

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3 WAYS TO BUILD PROFITS WITH IRIDITE

As a final finish, Iridite is available in a variety of attractive colors.

2 As a paint base, Iridite holds paint firmly, even on newly galvanized surfaces.

3 to reduce costs, consider using galvanized, plus Iridite, in place of more expensive metals.

HERE is a new quick-dip process that opens up vast new fields of use for galvanized sheets, products and parts. Iridite not only balks corrosion, but holds paint or clear lacquer firmly, even on newly galvanized surfaces. Tests by several paint companies show that Iridite keeps zinc from fouling the paint ... prevents formation of the soapy, chalky, underlying film that destroys adhesion. Galvanized products that have been Iridited take paint readily ... hold it permanently.

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For many uses, Iridite serves as an attractive final finish. It is available in a large selection of fast colors which do not vary. Included are blue, green, red, bronze, black and olive drab. Because of Iridite's excellent qualities as a paint base, all colors can be clear-lacquered for even greater durability, greater sales appeal.

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Send for free test panel and see for yourself how Iridite bans corrosion on zinc die cast, zinc or cadmium plated or galvanized surfaces. Iridite goes on with a quick dip of 15 to 60 seconds, is dried in a few seconds, permits immediate handling and shipping. Send for your test panel today. Write Rheem Research Products, Inc., 14110 Standard Oil Building, St. Paul and Franklin Sts., Baltimore 2, Md.

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Address

Mail Coupon for FREE Test Panel!

RHEEM RESEARCH PRODUCTS, INC.

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Brancher-570 Lexington Ava. New York 22: 20 E. Jackson Bivd., Chicago 44 2411 Sichel St., Los Angeles; 31. Distributors in: Waterbury: Grand Rapids, Detroit: Claveland; Los Angeles; Long Island City; St. Louis.



Gairing Hollow Mills are designed and built to secure the greatest machining efficiency, the longest tool life, the lowest machining costs.

Refinements in design permit their use in vertical or horizontal spindles for turning operations, facing, and shoulder cutting on castings or forgings. They give uniform accuracy and quality finish.

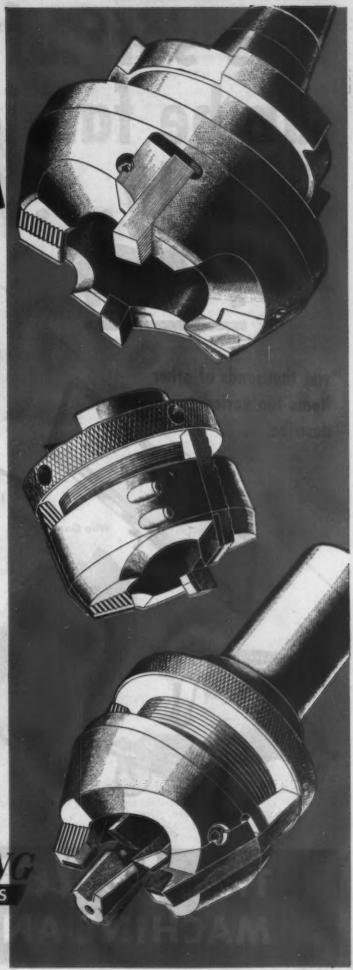
Blade adjustment is both radial and lateral. The serrated blades are securely anchored in position by engaging a corresponding serration in the body supported by a steel drawdown lock which holds the cutting blades rigid. The blades are capable of quick adjustment for release or replacement.

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all other types

Designers and manufacturers of Standard, Special and Gair-Lock Inserted Blade Cutting Tools.







Special Components

*and thousands of other items too varied to describe



Screen Good

Too

Wire Goods

Houseware

Tov

Special Shapes Containers

> Federal also makes all other types of resistance welders.

THE tedeval
MACHINE AND WELDER CO.



VERSATILE MODERN PRODUCTION TOOLS

READY-TO-NAIL MOULDINGS

Decorative or utility type metal mouldings with steel brads permanently attached, ready for continuous nailing, are made on a high production basis with the aid of automatic resistance welding employing a press type welder developed by The Federal Machine and Welder Company. The moulding is automatically indexed for proper spacing and the brads automatically cut and fed from wire reels. They go on in a hurry, and they never come off. The process is adaptable to many sizes of moulding and brads or nails.

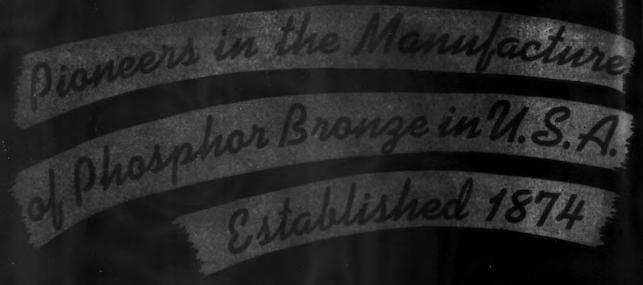
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Heavy duty metal tool and tackle boxes are made in the modern manner without the aid of any fasteners other than weld nuggets of the fabricated metal. One manufacturer has devised a lid-locking box in which not only is the box itself completely resistance welded, but hinges, handles and even the removable tray are made without fastenings. Using Federal spot welders with variable electrodes, this method can be made highly flexible... profitable on small runs of a variety of sizes and styles of containers. Such welders, operated according to instructions, make fabrications that are well nigh indestructible... neat and modern in appearance.

USEFUL SPOT WELDER BOOK

Detailed descriptions of a complete line of rocker-arm type spot welders made by The Federal Machine and Welder Company, plus some interesting discussion of the type of work to which they are best suited, are included in a new book offered by this company. Designated as "Bulletin No. 4510", it contains helpful information on airoperated, motor-operated and foot-operated spot welders.

The new book gives a clear idea of what a rocker-arm spot welder is and what it can do. It combines data formerly available in a group of separate folders, and is designed to simplify the problem of selecting the type of spot welding equipment best suited to particular production set-ups. Free copies may be had on request.





A metal that is hard and strong; resistant to: corrosion, wear, shock, abrasion, and fatigue; a perfect electrical conductor; non-magnetic; resistant to breakdown under arcing. Specify:

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THE: IRON AGE, October 4, 1945-189



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With Ajax-Northrup high-frequency melting, you can depend on precise composition, melt after melt. Melting is so fast (one ton of steel in one hour with 600 kw.) there is no time for oxidation. There are no carbon electrodes to confaminate.

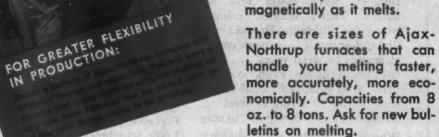
Every ounce of final additions is distributed uniformly throughout the alloy. That's because the Ajax-Northrup stirs electromagnetically as it melts.

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B.F.Goodrich RIVNUT

Use as blind rivet . . .

as nut-plate for attachment ... or both at once

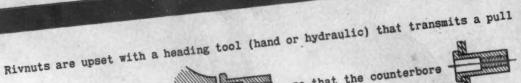
Rivnuts are one-piece blind rivets with real versatility. You can fasten with them, and fasten to them-or do both at once-all the while working entirely from one side! Rivnuts are strong, light, low in cost-and really simple to use.

Used as rivets, Rivnuts stand up well under severe single or double shear loads; resist being pulled through metal or plastic, even under conditions of eccentric load. For use as a nut-plate, Rivnuts are available with a key that provides high resistance to torque. No special preparation is needed before use. The Rivnuts' lateral expansion when headed makes them fit tight.

COUNTERBORE SHANK THREADS

Rivnuts are made in aluminum, brass and now STEEL! For high resistance to torque in wood, fiberboard or plastic, a Rivnut with a splined shank has been designed. In all types, a wide selection of sizes and grip-ranges is available. Or, if no standard Rivnut fits your particular needs, B. F. Goodrich engineers will be glad to work out special designs with you.

INSTALLATION OF RIVNUT IS EASY!



on the threaded portion



- so that the counterbore





(which is thinner) has to give. A bulge starts to form

push the counterbored portion until the expanding metal seats itself firmly against

the material being fastened



If aluminum or brass Rivnuts will be sub-

jected to torque, choose a Rivnut with



for increased resistance.

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All the details of the interesting Rivnut story—clear diagrams—test data—exact figures.
For the facts about this fastener, get "Rivnut For the facts about this fastener, get "Riv Data" now. Just write The B. F. Goodrich Co pany, Department 1A-10, Akron, Ohio.



ON BEING SEEN ... NOT HEARD

Once in awhile he could do it... If he tried real hard... If he could think kinda heavy about things around the room... Then he could—just sit...

Got awful tiresome tho'—sittin' not talkin'... He wondered now and then, if Mom wasn't askin' a lot... Each time before company came, she reminded: "Children should be SEEN NOT HEARD".

Yes, it was askin' a lot...Just the same as it would be for grown-ups...

We can all be SEEN NOT HEARD—once in awhile.

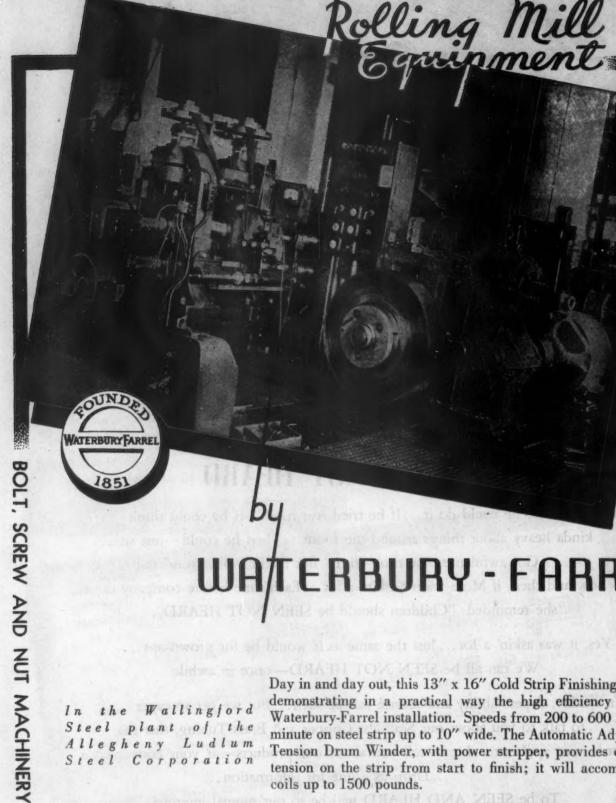
Our quality, dependability and service can be seen...But we get so eager to talk to you about our Seamless Copper and Brass Tubing, that the words must spill out...Let us tell you about our products—at your convenience ...Drop us a line for information...

To be SEEN AND HEARD will be to our mutual interests.

WOLVERINE TUBE DIVISION



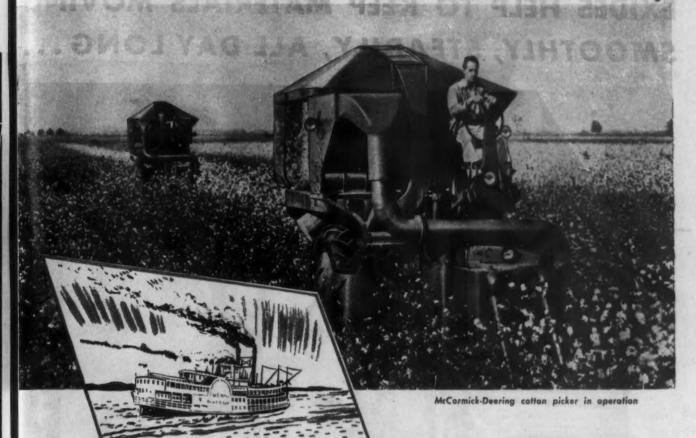
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Day in and day out, this 13" x 16" Cold Strip Finishing Mill is demonstrating in a practical way the high efficiency of this Waterbury-Farrel installation. Speeds from 200 to 600 feet per minute on steel strip up to 10" wide. The Automatic Adjustable Tension Drum Winder, with power stripper, provides constant tension on the strip from start to finish; it will accommodate

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coils up to 1500 pounds.



LAND O' COTTON



Lapointe special double ram vertical machine for broaching top, bottom and both ends of motor blocks. This is a 30-ton, 66-inch stroke machine.

Picking cotton by machinery may take away the glamour... but it sure adds to the profits — especially when the cotton picker is a precision machine. New postwar cotton pickers are depending upon broaching for close tolerance in their mass production parts.

Huge improvements expected in the farm implement field will come about through economical and efficient mass production of precision parts by broaching. With machinery costs at a minimum, manufacturers of agricultural products are turning to the Lapointe engineering staff for help in the saving of time, money and space.



MACHINE TOOL COMPANY

THE WORLD'S OLDEST AND LARGEST MANUFACTURERS OF BROACHES AND BROACHING MACHINES.

EXIDES HELP TO KEEP MATERIALS MOVING SMOOTHLY, STEADILY, ALL DAY LONG...



Lifting and shifting, loading and unloading, hauling and stacking—the lowest materials handling costs are assured when unit loads are handled by electric industrial trucks.

When your electric industrial trucks are Exidepowered, you can count on full shift availability day after day. There is no costly down time, for Exides stay steadily on the job, delivering the same efficient performance during every working hour—a factor that makes Exide-powered electric industrial trucks the most economical of all materials handling units. When you buy an Exide you buy dependability, longlife and ease of maintenance.

Write us for a FREE copy of the bulletin "Unit Loads," prepared by The Electric Industrial Truck Association. It tells how to cut handling costs up to 50% ... covers latest developments in materials handling ... and includes actual case histories.



ABR

THE ELECTRIC STORAGE BATTERY CO., Philadelphia 32 · Exide Batteries of Canada, Limited, Toronto

manufacturing facilities.

SILE

Grinding Wheels no larger than a grain of wheat, Grinding Wheels as thick through as a man's chest, with a diameter equal to a man's height. Abrasive grains of Borolon and Electrolon ranging from the size of a flour particle to the size of a pebble. Such a range of sizes available in thousands of different combinations of abrasive types, grades, structures and bond types is an indication of the immensity of Abrasive Company

And yet with its great floor acreage, its complete equipment, ample laboratories, testing departments and large organization, Abrasive Company is not too large to give interested, competent, personal attention to each inquiry, each order, each customer.

For your normal grinding wheel and other abrasive requirements; for your special needs requiring "custom" service, you may rely upon Abrasive Company quality. Whether from the factory or from distributors' stocks, the Borolon and Electrolon products you buy have been subjected to scientific tests and inspections to insure their accuracy for balance, concentricity and conformity to specification.

All Abrasive Company Wheels bear blotters for easy identification of specifications according to the New Standardized Marking System.

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round the clock whether, Tuese abilities

ABRASIVE COMPANY . PHILADELPHIA : DISTRIBUTORS IN ALL PRINCIPAL CITIES

Compani

THE IRON AGE, October 4, 1945-199



is second nature to men who make

TUBE TURNS

Better Forgings for Industry

ENGINEERS who design Tube Turns forgings, tool and diemakers who fashion the dies, men who supervise production and heat treatment and the laboratory technicians who exercise rigid production control—all know steel, backwards and forwards and inside-out. Forging steel was their business long before the war began.

When America prepared for war, all of Tube Turns' forging skills were immediately demanded for government work.



New methods and techniques were devised, capacity increased by new equipment and round-the-clock schedules. These abilities and this capacity are now available for the improvements of peacetime products.

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Where can the lighter weight and greater strength of upset or mechanical press steel forgings contribute to improvement of the equipment you manufacture? Inquiries will receive prompt and complete co-operation from Tube Turns engineers. Write TUBE TURNS (Inc.), Louisville 1, Ky.



200-THE IRON AGE, October 4, 1945

How to be sure of getting your

MONEY'S WORTH

Right now there are some bargains in machine tools on the market. And there are some lowpriced used machines for sale that are distinctly not bargains.

To be a good buy, anything you purchase should be worth more to you than the money you pay for it.

So far as used Acme-Gridley Bar Automatics are concerned, we suggest that you buy only on the basis of positive information as to the present condition of the machine and its adaptability to your production, regardless of age or model.

If the cost of the used Acme-Gridley, plus reconditioning and retooling costs, totals less than the cost of the same model new, chances are it is a good investment.

But be sure that a new model, even at higher cost, would not be a still better investment, because of its greater production ability.

We have a "cradle to grave" interest in all Acme-Gridleys—an interest in seeing that, old or new, they are profitable producers for their owners.

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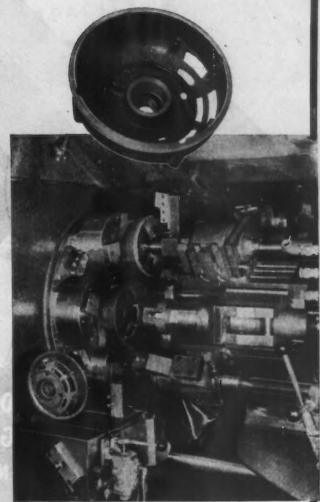
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oprite Ky. So we want you to feel free to call upon our experience in making your decision.

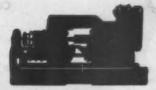


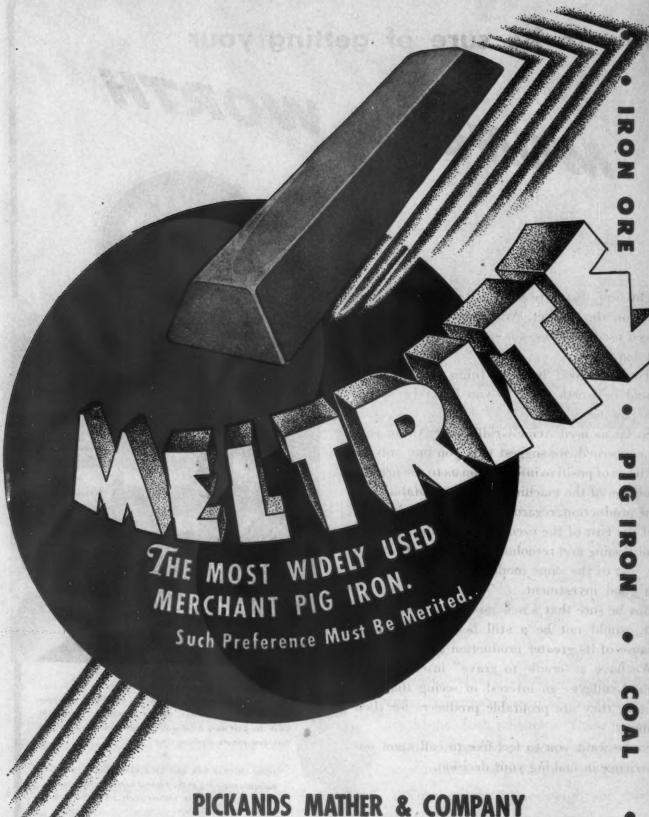
Sample of Low-Cost Production on a new Acme-Gridley 12" 6-spindle chucking machine. On this cast iron motor bracket, 10½" diameter, the 14 operations needed to finish the part were done with carbide-tipped tools in less than one minute machine time.

ACME-GRIDLEY BAR and CHUCKING AUTOMATICS maintain accuracy at the highest spindle speeds and fastest feeds modern cutting tools can withstand.

THE NATIONAL ACME COMPANY

170 EAST 131st STREET . CLEVELAND 8, OH O





CLEVELAND . CHICAGO . DETROIT . ST. LOUIS ERIE . DULUTH . MINNEAPOLIS . TOLEDO

New York City-William R. Alley Philadelphia, Pa.—Carson, Marshall & Co. San Francisco and Los Angeles, California; Seattle and Tacoma, Washington; Portland, Oregon— H. L. E. Meyer Jr., & Co.

3C"TAKES ON A NEW MEANING



These advertisements illustrate the combined advantages of buying 3C" Electrical Con

3C" TAKES ON A NEW MEANING ... CAPACITY-CAPABILITY-CONTINUITY

THE CLARK

Additional machinery and equipment being installed will focultate production of all types of "SC" Electrical Coutral apparatus. This new CAPACITY means more to us that mere added space. It means a co-ordinate capability to:

Develop new apparatus
 Interpret existing devices
 Increase Commercial and Application Engineering Service

"3C" TAKES ON A NEW MEANING. CAPACITY-CAPABILITY-CONTINUITY

3C TAKES ON A NEW MEANING ...

THE PRESENTATION PROPERTY.

CONTINUITY you look for leatures that will assure: 1. Long life for the control appearal 2 Fewer production interruptions 4. Trouble-tree operation

This is what we mean by CONTINUITY. The Clork Controller Company puts into "gc" apparatus the experience of years. up-to-drie-developments, engineering "mow-how," highly trained personnel.

to controlling CONTINUITY. THE CLARK CONTROLLER CO.

CAPABILITY neers are the connecting links between our plant and users. These Application Engineers have highly developed CAPABILITY in solving Decision County of the Capability of the C

3C Application Engineers are: 1. Specialized Electrical Engineers 2. Vernatile in their experience with '2C' Control 3. Solvers of Electrical Control problems in all This is what we mean by CAPABILITY

For CAPABLE control opporatus Applic cored by CAPABLE mon. conte

THE CLARK CONTROLLER

THE CLARK CONTROLLER CO.

1146 EAST 152nd ST., CLEVELAND 10, OHIO . EVERYTHING UNDER CONTROL



Quick

Delivery

• When you reconvert...look at your bearings. Your machinery and equipment will have to stand the same terrific strain in peacetime production as it did in war. You can prevent future costly breakdowns and interruptions by installing NEW bearings NOW.

When you install Johnson QUALITY Bearing Bronze you get the highest quality available. You are assured of years of smooth, efficient bearing performance.

We had no reconversion problem. We changed from war production to peacetime operation overnight. Now once again you can secure excellent delivery on Johnson UNIVERSAL Bronze Bearings... Electric Motor Bearings... General Purpose Bearings. Call in your local Johnson Bronze Distributor for quick service on Johnson Quality Bronze.





if it's for industrial use...we make it

For 52 years we have specialized in manufacture of all types and sizes of gears. One of our special fields is mill gearing. We have the capacity to hob staggered-tooth herringbone type mill gears such as shown above up to 130 inch pitch diameter, 24 inch face and 1.25 diametrical pitch.

For the same diameter and face width the horsepower capacity and life of herringbone type gears are definitely superior to straight tooth spur gears. The tooth action is also smoother and when wear takes place the original involute form is maintained longer than for spur teeth.

Remember, though, we are equipped to produce all types of gears...let us give you unbiased recommendations to better meet your particular conditions.

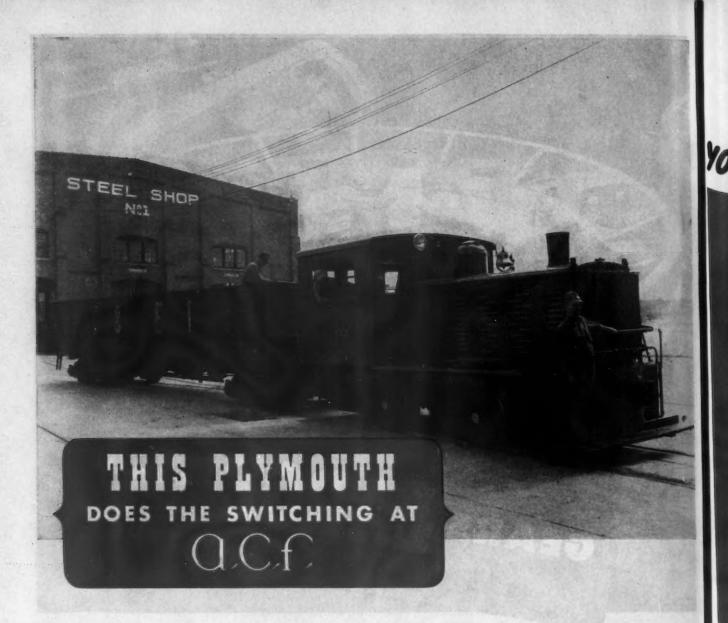
The Philadelphia Gear Catalog is full of helpful information for gear buyers. Write on your business letterhead for a copy.



ERIE AVE. AND G ST., PHILADELPHIA 34, PA. NEW YORK - PITTSBURGH - CHICAGO



Industrial Gears and Speed Roducers
Limitorque Valve Controls



Because Plymouths are built in a wide range of sizes from $2^{1}/_{2}$ to 80 tons, and adapted for either gasoline or diesel fuel, warehouses, docks, oil refineries, quarries, cement plants and the steel industry may select a Plymouth for any kind of industrial transportation.

The 35-ton Plymouth Gasoline Locomotive shown above is providing The American Car and Foundry Company, St. Charles, Missouri, with many advantages and real economy in operation over the previous type of locomotive they used.

Plymouth Locomotives are clean and easy to operate; they're dependable and powerful and designed for 90 per cent availability... these are features which make Plymouths popular in hundreds of plants in this country, and among the men who keep the supply lines moving on the fighting fronts.

Right now is the time to think about improving your transportation . . . give us your problem . . . we'll give you the facts.



PLYMOUTH LOCOMOTIVES

GASOLINE, DIESEL MECHANICAL AND DIESEL ELECTRIC

YOU GAIN WHEN YOU STANDARDIZE ON **MORSE TOOLS** ONE STANDARD OF QUALITY . . . The name "MORSE" on cutting tools stands for care in every detail of manufacture, to insure profitable service. ENGINEERING SERVICE . . . The cooperation of our field engineers and of our Physical, Chemical and Engineering Laboratories is available to manufacturers to solve special problems.

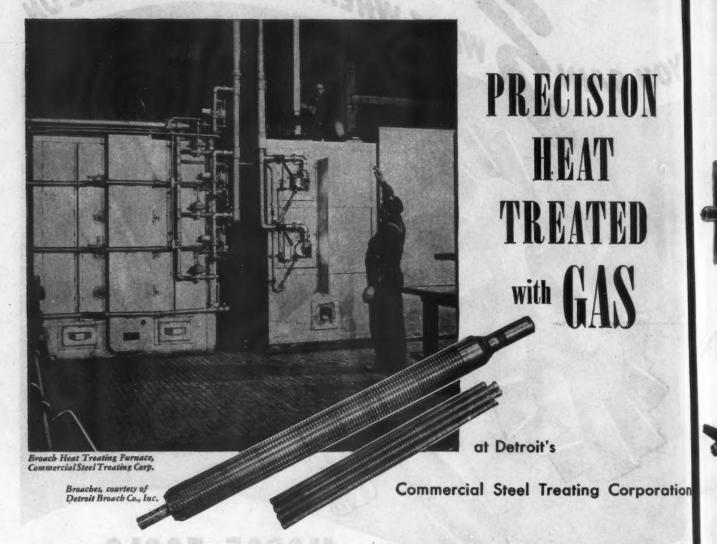
SINGLE SOURCE ADVANTAGES . . . Plants gain materially when they give us opportunity for full cooperation. The convenience of single-source supply in buying and maintaining tool stocks is self-evident.

MORSE

MACHINE COMPANY
NEW BEDFORD, MASS., U. S. A.

NEW YORK STORE: 130 LAFAYETTE ST. • CHICAGO STORE: 570 WEST RANDOLPH ST. • SAN FRANCISCO STORE: 1180 FOLSOM ST.

BROACHES-Master tools of Mass Production-



In the Detroit area, where mass production of metal parts has probably achieved heights unsurpassed in the world, it is estimated that one-third of the broaches made in this country are produced. Used to finish steel parts in mass production, the broach has accomplished wonders on the production line and must be carefully heat treated to help effect such results.

For instance, it cuts "keyways" in gears, "splines" in propeller hubs, and rifling in machine gun barrels. When first applied to the latter task, time was cut from six days to eight hours. Distortion can not be tolerated in the heat treated broach and uniform hardness must be secured—an obvious necessity in a tool that must cut many steel parts at a time.

In the Gas fired heat treating furnaces of Commercial Steel Treating Corporation, it was found that close accuracy of heat control so essential to best results in the finished product, was achieved, while absolute cleanliness prevailed. Customers of the plant are well satisfied with the Gas heat treated broaches from these furnaces.

You may never heat treat broaches but you can successfully utilize the accurate, automatic control that Gas brings to broach heat treating—no matter what your heat treating problem. Why not consult the Industrial Engineer of your local Gas Company who has valuable data on the newest Gas heat treat operations.

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AMERICAN GAS ASSOCIATION

INDUSTRIAL AND COMMERCIAL
GAS SECTION

420 LEXINGTON AVENUE, NEW YORK, 17, N.Y.





SKF QUALITY 52100 STEEL CAN DO IT-

IN ITS ANNEALED CONDITION IT IS EASILY BECAUSE ... MACHINEABLE A UNIFORM HIGH HARDNESS CAN BE OBTAINED WITH MINIMUM DISTORTION FINISH AFTER HARDENING IT CAN BE GROUND TO MIRROR Whatever your steel problem—keep these three things in mind always-

- SKF QUALITY CONTROL
- OSKF STANDARDS
- . SKF RESEARCH LABORATORY FACILITIES

All these make SKF QUALITY 52100 STEEL possible and assure you of a superior product.

This extremely thin thrust washer is a part of an aircraft motor, subjected to great pressure. Dimensions are:

O. D. 2.225" (Tolerance ± .005") I. D. 2.0065" (Tolerance ± .0005") Thickness .04395" (Tolerance ± .00025")

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Diameters must be concentric within .005" full indicator reading, and flat surfaces parallel within .0005". Flat surfaces are finished ground to 10" RMS maximum, and lapped to mirror finish After machining it is hardened and tempered to minimum Rc 58. It was cut from a stock size of SDSF QUALITY 52100 STEEL TUBING. For such exacting specifications and high pressure only a steel of outstanding freedom from non-metallic inclusions and good structure is usable. That is why 2003 QUALITY 52100 STEEL was selected for this vital aircraft part.

We maintain a complete and balanced stock of BISF HIGH CARBON-CHROME (52100 type) STEEL SEAMLESS TUR-ING and ROUND BARS for immediate delivery.

TUBING: Approximately 300 sizes ranging from less than 1" O. D. to 81/2" O. D. with heavy and light wall thicknesses and close tolerances.

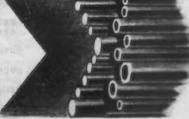
BARS: Ranging from 13/64" to 61/2" hot rolled, cold drawn, centerless ground or turned finish.

Completeness of BISF stocks and immediate BISF deliveries make practically all inventory costs unnecessary. Use ours as your own warehouse. Phone or write for latest stock list.

> AS YOU NEED IT-WHEN YOU NEED IT-TO SUIT YOUR EXACT REQUIREMENT

SKF STEELS, INC. 420 LEXINGTON AVENUE NEW YORK 17, N. Y.

111 W. Washington St., Chicago 2, III. . 403 W Baltimore, Detroit 2, Mich. 110 Frelinghuysen Avenue, Newark S, N. J.



CHECK ANOZINC

FOR BETTER CORROSION RESISTANCE on Zinc-Coated Surfaces

1. PRODUCTION-LINE PROCESSING of parts which have been racked and zinc plated or of zinc-coated sheets, wire and strip.

- 2. THREE FINISHES for distinctive "eye-appeal":
 sparkling Clear, deep Black, and an attractive,
 sparkling Yellow. All give appearance plus proiridescent Yellow.
- 3. EASILY ADAPTED PROCEDURE—Processing time of Anozinc bath readily adapted to automatic equipment—can be varied to suit your conditions.
 - 4. OPERATION AT ROOM TEMPERATURE eliminates the necessity for heating or refrigerating facilities in connection with this treatment.
 - 5. EASY DRYING without elaborate ovens or controlled temperatures. After using Anozinc tréatment, standard drying methods can be used.
 - 6. EXTRA ABRASION RESISTANCE—with an Anozinc bath parts can be handled like plated coatings. No special care needed to handle parts before they are dried.
 - 7. TEMPERATURE STABLE SURFACE protective value of the finish is not affected by temperatures value of the finish is not affected by temperatures value of the finish is not affected by temperatures.

8. EXCELLENT PAINT BASE enabling baking or air drying paints and lacquers to adhere with unusual firmness.

- 9. BENEFITS OF ELECTROLYTIC TREATMENT

 -use of current results in a more durable finish as

 well as a wider operating range.
 - 10. CONVENIENT COMPOUNDS salts for your.

 Anozinc bath are convenient to handle; inexpensive to ship and store.
 - 11. EXCELLENT THROWING POWER—a protective finish can be produced with Anozinc wherever zinc can be deposited.
 - 12. EASILY CONTROLLED SOLUTION—no frequent additions required to keep it stable. Simple, dry compounds for adjusting solution as needed. No periodic discarding required.
 - 13. NON-CORROSIVE SOLUTION permitting use of unlined steel tanks: No stripping of zinc from recessed areas.
 - 14. INEXPENSIVE OPERATION because of the low cost stable bath—simple equipment—short operating cycle—ease of control—and standard drying procedure.

LET US TELL YOU MORE

Simply tell us the kind, quantity and size of parts to be treated, and the type of zinc used. Immediate attention will be given your inquiry.

OTHER U. C. PRODUCTS AND PROCESSES TO SERVE YOU

- ACHROMIUM PLATING for wear-resisting, oilretaining and other types of finishes.
- **☆UNICHROME ALKALINE COPPER** for smooth, lustrous copper plating in a non-cyanide bath.
- **☆UNICHROME DIP** for increased corrosion resistance of zinc and cadmium without electric current.
- ☆UNICHROME STRIP for speedy removal of copper, chromium, zinc, etc. ☆Trade Mark U.S. Pet. Oct.
- **☆UNICHROME RACK COATINGS**
- *UNICHROME STOP-OFF LACQUERS AND COMPOUNDS
- ☆UNICHROME Clear and pigmented LACQUERS
- ☆UCILON corrosion-resistant coatings for protecting surfaces against acids, alkalies, water, gasoline and various corrosive chemicals.

UNITED CHROMIUM

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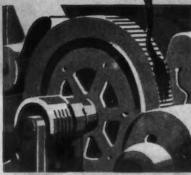
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INCORPORATED

51 East 42nd Street New York 17, N. Y.

Waterbury 90, Conn. - Detroit 7, Mich.

ADHERES TO GEARS-YET POURS ON COLD!



1. Keeping a protective grease on exposed gears has been one of industry's most troublesome lubrication problems. To be effective, gear grease has to stand up under severe pressure, high speed, and weather extremes.



2. After several years of extensive research, Union Oil solved the problem by developing GEARITE. GEARITE contains a high-quality lubricating grease especially selected for its tackiness and resistance to water.



3. This base is then compounded with a solvent that acts as a penetrating and carrying agent. The solvent permits GEARITE to be applied cold by any method: pouring, drip-cup, spray-gun, or paintbrush.



4. As the solvent rapidly evaporates, a lubricating film is quickly formed preventing metal-to-metal contact under the most severe operating conditions. It won't throw off, dry out, harden and chip, or wash away.



5. Thoroughly tested on all types of exposed gears, GEARITE has proved superior in every way. Order a supply of this grease that adheres to gears yet pours on cold. It's the easy way to protect gears.

Your Union oilman will be glad to furnish more information and deliver a supply.



Mich.

Gearite

Another UNION OIL
Success-Tested Product



Build longer life, better performance, into your products...with rugged, dependable SPERTI HERMETIC SEALS



Buyers who have waited through the war years will be looking for big improvements in your products. You'll have to meet civilians' expectations... just as you have met military specifications.

You can do it by building longer life, better performance, more trouble-free operation into your products. That calls for Sperti Hermetic Seals, the rugged. dependable, war-proved seals that effectively shut out dust, moisture and deteriorating agents.

Sperti Hermetic Seals are durable, one-piece units, easily soldered-in at less expense. Because of Sperti's advanced manufacturing methods, plus exhaustive tests and inspections, you'll get "true" seals that cut down production delays and costly rejects in the inspection line.

WRITE, TODAY. Get the facts. Find out about the many product applications of Sperti Hermetic Seals and their performance advantages.

HERE'S WHY
LEADING MANUFACTURERS CHOOSE
SPERTI HERMETIC SEALS

Seal out dust, fungus, salt spray, sand atmosphere at high altitudes, etc.

Will add longer life to a product.

Will help reduce operational troubles.

Are one-piece, rugged units. Easily soldered-in at less expense.



INCORPORATED . CINCINNATI 12, 0

MANHEACTHRING

CONSOLIDATED
MACHINES
ENGINEERED TO
PERFORMANCE
LEADERSHIP

BETTS 20' BORING MILL IN OPERATION IN A WEST COAST WAR PLANT

BETTS 20' VERTICAL BORING AND TURNING MILL

Among Heavy Machine Tools built by Consolidated are . . .

LATHES
BORING MILLS
DRILL PRESSES
MILLING MACHINES
BORING MACHINES
PLANERS
SLOTTERS
RAILROAD SHOP TOOLS
AUTOMOTIVE TOOLS
AND OTHER
SPECIAL TOOLS

One of the reasons behind Consolidated's enviable reputation in the heavy machine tool industry is its determination to build the greatest amount of productive value into every Consolidated machine... to provide a new degree of profitable operation through latest design... to eliminate wasted time and effort by improved operation and control... and increase production through Consolidated engineering skill backed by years of experience. That this policy has proved successful is evidenced by Consolidated's position in its industry.

BUILDERS OF HEAVY DUTY MACHINE TOOLS SINCE 1861

BETTS . BETTS - BRIDGEFORD . NEWTON . COLBURN . HILLES & JONES . MODERN

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CONSOLIDATED MACHINE TOOL CORPORATION

ROCHESTER 10, NEW YORK

Competitive

st-minded production men are sharp ming their pencils like never before erylandy who machines steel and non-fermetals "chooses" cutting tools by what comparative performance figures show.

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roduction figures under wartime conditions in one plant reveal an average increase of 14 more parts per hour on 62 different operations by use of Vascoloy-Ramet Tantalum/ Ungsten Carbide Tools.

Our field representatives are ready at all times to help you in the application of the "World's Finest Carbide Tools" on your lines. Write for your copy of Bulletin VR-350A.

DETROIT ORTH CHICAGO

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N AFFILIATE OF FANSTEEL METALLURGICAL CORPORATION AND VANADIUM ALLOYS STEEL COMPANY NORTH CHICAGO, ILLINOIS . DISTRICT SALES & SERVICE IN PRINCIPAL CITIES

214-THE IRON AGE, October 4, 1945

ADAMS AUTOMATIC WATER FILTERS

Remove GRIT and DIRT* from River Water *15 times finer than 1/3/2

Adams Poro-Screen Filters offer a practical answer to large-scale filtration of dirty river water for use in hydraulic equipment. Designed for continuous, automatic operation and requiring a minimum of attention, Adams Automatic Filters supply the required volume of clean water for your operations—water free of dirt and grit which damage bearings, rolls, valves and other equipment. Highly successful on water cooling installations of open-hearth and heattreating furnaces.

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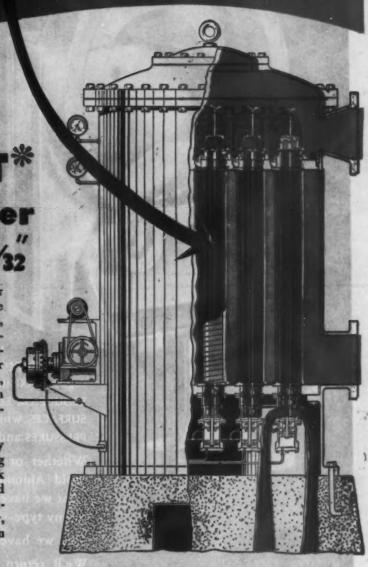
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the nes. Adams Automatic Filters provide low velocity filtration. Their multiple tube design has no moving clearances, is fully automatic. One tube is back washed at a time while filter is delivering full rated capacity. Adjustable control gives flexibility of backwashing—excessively dirty water more frequently, normal water less frequently. Built in four sizes from 300 gpm. to 2000 gpm. Write for Bulletin 901.



* R. P. ADAMS COMPANY, INC. *

73 CHICAGO STREET, BUFFALO, N. Y.

PORO-STONE AND PORO SCREEN



~ m-m-m~

PRIME SOURCE
OF PERMANENT
MOLD
ALUMINUM
CASTINGS

>n-m-m<

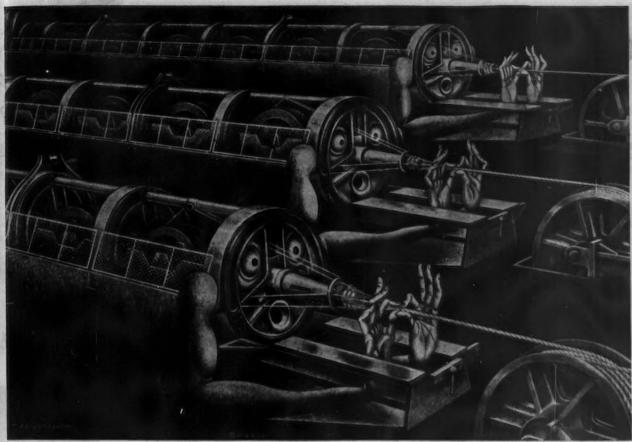
... which provide these definite and tangible advantages: MAXIMUM STRENGTH • CLOSE TOLERANCES which REDUCE OR ELIMINATE MACHINING • SMOOTH, CLEAN SURFACES which SAVE TOOLS • RESISTANCE tO HIGH PRESSURES and SHOCK • LOWERED WEIGHT.

Whether or not you are familiar with Permanent Mold Aluminum Castings, you'll be interested in what we have to offer if you use aluminum castings of any type—in volume.

May we have your specifications?

We'll return them promptly with an engineering survey, prices and delivery which will more than meet your requirements.

MATIONAL
ALUMINUM Manufacturing Company
PEORIA · Illinois



Ninth of a series of 'Artzybasheff's impressions of the manufacture of steel wire products

ROPE ROBOTS REQUIRE

Spinning six strand, steel-sinewed wire rope at high speed . . . the job of a closing machine . . . calls for tough, skillfully prepared rope wire.

The steel for Wickwire Spencer rope wire is made in our own open hearth furnaces. This type of refining furnace removes all but absolute minimum quantities of harmful phosphorus and sulphur. It likewise permits blending of proper proportions of carbon and manganese to produce rope wire that meets exacting specifications.

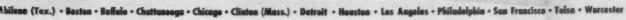
As a further assurance of high, uniform quality; only the sound "heart" of the steel ingot is used for rope wire. Careful rolling, drawing and processing result in wire with the highest possible degree of hardness, strength, toughness and fatigue-resisting qualities.

The same careful control and skilled craftsmanship is used in producing all Wickwire Spencer wire: For, as makers and workers of wire, we know that it must be uniform in size, tensile and stiffness. Then it's easier on wire working machines and customers are satisfied.

If you want steel wire of any size, temper, analysis or finish; round, flat or shaped; send your order or inquiry to Wickwire Spencer. We'd like to add your name to our long list of satisfied customers.

Send your wire questions to







A minute's main natter, indeed. But price the minutes it takes your people to write records, using old-fashioned, inefficient forms. Add these up in every department where records are kept, and chances are they re no longer just minutes—but hours of costly, percoductive time!

Moreover, this often means customer delays—delays that risk their goodwill. That's why it's important to modernize your record writing methods with prefabricated forms such as Uarco Registers can bring you. Always ready for instant use, they put an end to the gathering of coose sheets... inserting of carbons... arranging and shuffling...slow, laborious taking apart jobs.

Load a UARCO Register once—and you have forms enough for a full day's use—or more. They provide a firm writing base and feature clean, legible copies made from an ever-fresh carbon roll. And if desired, there are UARCO Registers that automatically file a copy of every record written. Talk to your UARCO representative. See how UARCO Registers can save you time and money. Or write today.



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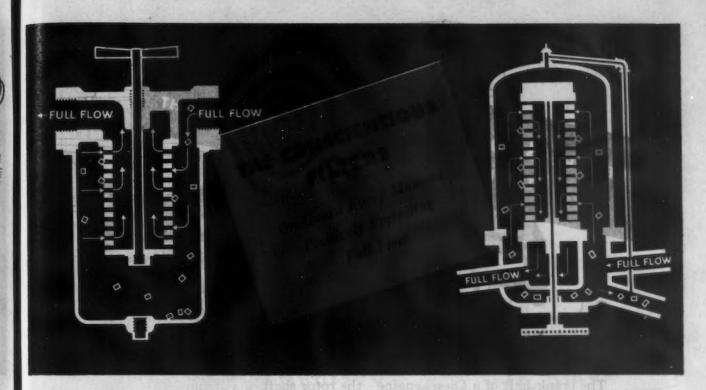
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And

For instance: The UARCO Accu-Rite Register—valuable for all order form writing—automatically refolds a copy and files it in a protection chamber under lock and key. It steps up the writing of orders... provides faster service to customers... safeguards records against loss. Ask for further information.

UNITED AUTOGRAPHIC REGISTER COMPANY Chicago, Cleveland, Oakland • Offices in All Principal Cities





Regardless of the character of the solids you want removed from fluid, there is a Cuno "filter-fine" strainer to handle full flow . . . without interruption.

Whether you use the Cuno Auto-Klean or the Cuno Flo-Klean (the latter for fluids containing highly-abrasive solids), you can count on continuous cleaning of all the fluid each time it passes through the system. And flow continues, uninterruptedly, even while the filter is being cleaned.

The Auto-Klean is cleaned by turning a handle (by hand or by motor). The Flo-Klean is cleaned by a motor-driven backwash nozzle.

For the convenience and efficiency of a compact, easy-to-take-care-of filter, promising positive filtration of full flow...run your fluids through a Cuno. You'll find a catalog of filter selection factors and specifications in SWEET'S. Cuno's engineering staff will help you on special conditions.





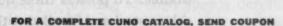
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CUSainst

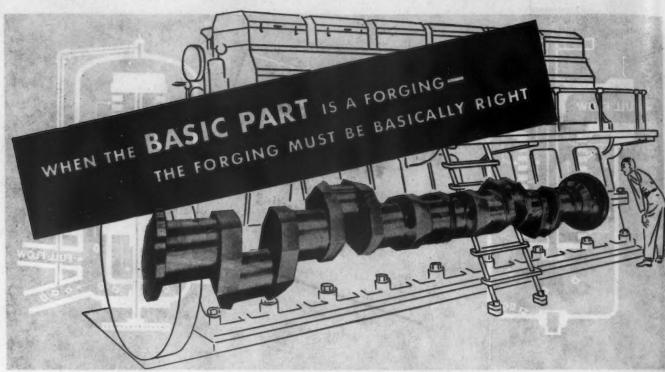
AUTO-KLEAN disctype. For all fluids except those containing highly abrasive solids. Viscosities from 30 to 50,000 Saybolt seconds. Minimum pressure drop. Continuously cleanable. Occupies no more space than usual partial-flow type. Sizes from 1½" diam. x½" cartridges to massive motor-driven models. Available with or without sump for built-in or external installations. cept those containing stallations.

FLO-KLEAN wire-wound. For fluids containing highly abrasive solids such as metal chips, abrasive wheel particles, sand, etc. May be designed to remove particles .0025" or larger.

Low pressure drop fluid moves in straight line, encountering only momentary restriction. All parts made of metal - constructions to meet varying corrosive and erosive conditions.



interested in the serv		alog. I am especially
Acids Air Alkali Boiler Feed Casein Cleaning Solutions Coatings Compressed Air Coolants Cutting Oils Dip Tank Systems Enamel Engine Fuel Engine Lubricating Oi Fuel Oil	Gases Gasoline Grease Grinder Coolant Hydraulic Oil Japan Lacquer Lubricating Oil Machine Tool Cutting Oil Machine Tool Hydraulic Oil Machine Tool Lubricating Oil Nitrocellulose Solutions Oils	Paint Pyroxylin Quenching Oil Resins Rust Proofing Compounds Sizing Solvents Spray Systems Tar Test Stand Lubricatin Oil Varnish Washing Compounds Water Wax
Others		



The crankshaft of a Diesel engine—the rotor shaft of a steam turbine—the spindle of a machine tool are typical of the "basic" functions forgings must perform in making engines, power plants and machinery live up to "their good name" in actual service.

When you buy such a forging, you want faithful adherence to specifications but you also want something more. You want an inherent quality that spells longevity and freedom from trouble. To possess these qualities a forging must be born of clean steel and handled with constant skill through all the critical stages of forging, heat treating and precision machining.

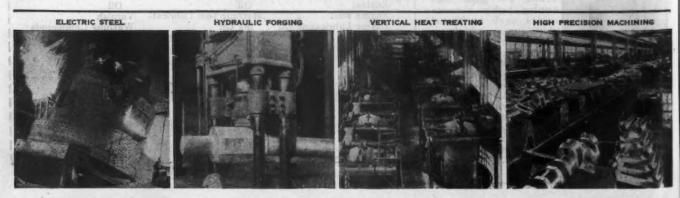
It takes equipment, experience and men who really have the "know how" to produce that kind of forging—and that is the only kind of forging worth while buying, if your reputation hinges on how that forging performs. Let National Forge tell you about it now, for National Forge can serve you now.

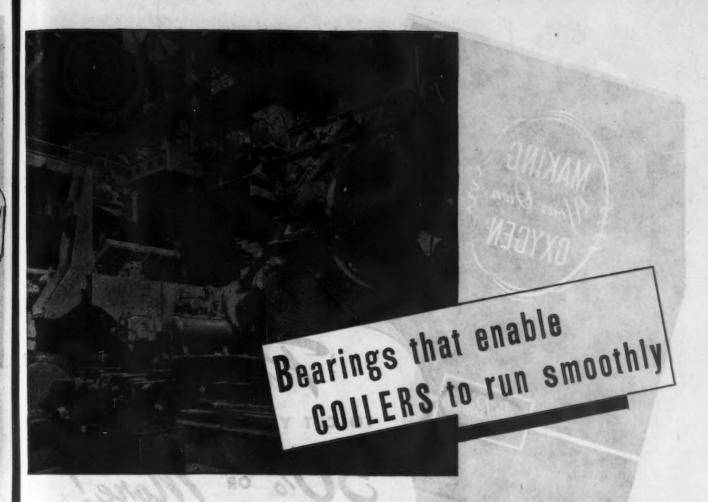


Have you read this book? If not, write for it now.

NATIONAL FORGE & ORDNANCE CO.

IRVINE, WARREN COUNTY, PENNSYLVANIA
"WE MAKE OUR OWN STEEL"





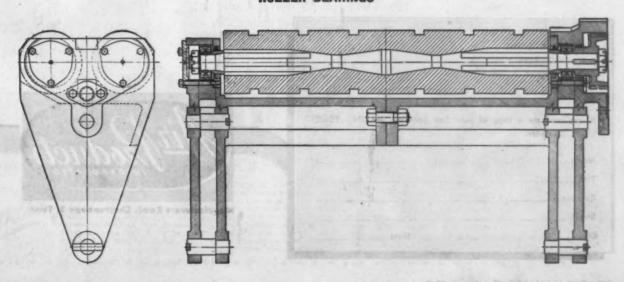
It's spherical Roller Bearings are used to take the shocks and heavy loads of hot strip coiler operation. Their high load carrying capacity, undiminished by misalignment, makes it possible to fit an adequate bearing within

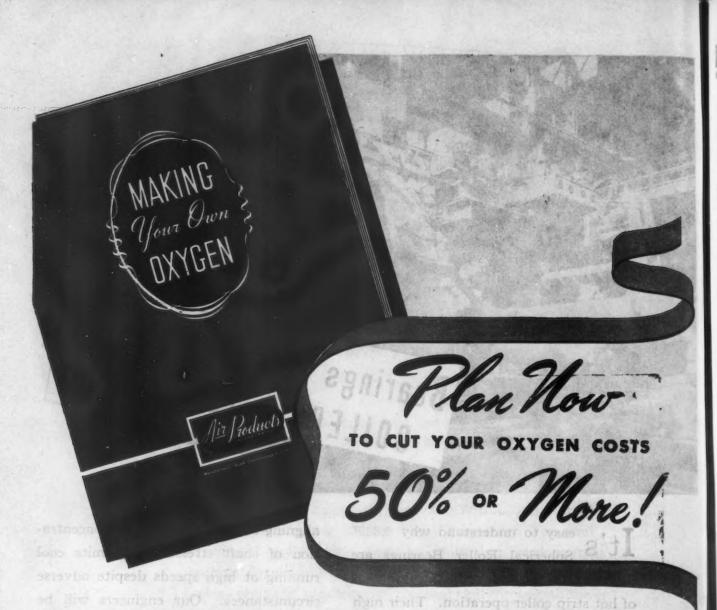
space limitations. Their

aligning ability prevents the concentration of shaft stresses... permits cool running at high speeds despite adverse circumstances. Our engineers will be glad to give you their unbiased answers to *your* bearing problems.

BESF INDUSTRIES, INC. PHILADELPHIA 34, PA.

SKF ROLLER BEARINGS





You can increase your profits by cutting your oxygen costs. And the modern AIR PRODUCTS generator for making your oxygen in your own plant will save you 50% or more. Our method of furnishing your oxygen supply is new and revo-

lutionary, but it has been thoroughly proven in peacetime production and improved wartime operation. Don't make long-range commitments for oxygen until you get the facts on AIR PRODUCTS generators. Write today for our booklet. Use the coupon.



Manufacturers Road, Chattanooga 5, Tenn.



DAMAGE EXPELLER!

While using slotted screws, work-spoiling driver skids were causing frequent damage to plastic shades in the assembly of desk lamps. Refinishing slowed down production, and spoilage boosted costs...until the manufacturer started using Phillips Recessed Head Screws.



PROBLEM DISPELLER!

Phillips Recessed Head Screws, engineered to take heavier driving pressures, simplify product design, give it more strength, more rigidity...often with the use of fewer screws. Screw-driving is faster, easier, surer...permits design innovations slotted screws just can't touch.



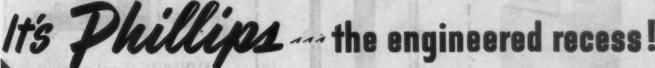
OUTPUT IMPELLER!

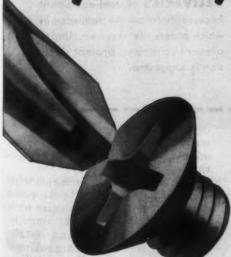
With the change to Phillips Screws, damage and delays were eliminated. And with no more worry about driver skids, power drivers could be used, speeding output further. Costs came tumbling down...production set new records.



SALES PROPELLER!

The Phillips Recessed Head radiates quality. It's trimmer ... smarter looking ... modern as tomorrow. No unsightly burrs and uneven appearance to cool off interested prospects. Put the extra sales push of Phillips Screws behind your product ... make good merchandise look better!





In the Phillips Recess, mechanical principles are so correctly applied that every angle, plane, and dimension contributes fully to screw-driving efficiency.

... It's the exact pitch of the angles that eliminates driver skids.

... It's the engineered design of the 16 planes that makes it easy to apply full turning power – without reaming.

... It's the "just-right" depth of recess that enables Phillips Screw Heads to take heaviest driving pressures.

With such precise engineering, is it any wonder that Phillips Screws speed driving as much as 50% - cut costs correspondingly?

To give workers a chance to do their best, give them faster, easier-driving Phillips Recessed Head Screws. Plan Phillips Screws into your product now.

PHILLIPS Recessed SCREWS

WOOD SCREWS . MACHINE SCREWS . SELF-TAPPING SCREWS . STOVE BOLTS

Made in all sizes, types and head styles

25 NRCES

American Serew Co., Providence, R. I.
Atlantic Serew Works, Hartford, Conn.
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Central Serew Co., Chicage, III.
Chandler Products Corp., Cleveland, Ohio
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The Carbin Serew Corp., New Britain, Conn.
General Serew Mfg. Co., Chicage, III.

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New England Screw Co., Keene, N. H.
Parker-Kalen Corp., New York, N. Y.
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Pheoli Manufacturing Co., Chicago, III.
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Russell Burdsall & Ward Belt & Nut Co., Pert Chester, N. Y.
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Shakepreef Inc., Chicago, III.
The Seuthington Hardware Mfg. Co., Seuthington, Cona.
The Steel Company of Canada Ltd., Hamilton, Canada
Welverine Bolt Co., Detroit, Mish.

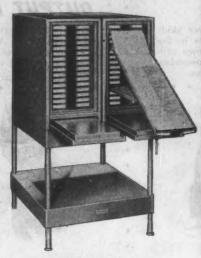
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STEEL RETURNS!

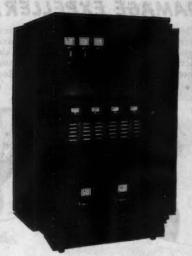
... designed to complement today's improved record controls



ARISTOCRAT STEEL FILES for Long, Dependable Service



MODERN SAFE-KARDEX for Visible Administrative Control



SAFE-CABINET EQUIPMENT for Certified Fire Protection



STEEL LEDGER TRAYS
for Machine Posted Records



VISIBLE INDEXING EQUIPMENT for Fast, Accurate Reference



DELIVERIES of steel equipment necessarily follow the sequence in which orders are received. Under present conditions, prompt decision is suggested.

It's good business
to combine
Equipment VALUE
and
Methods ECONOMY!

War production experience taught us new facts about performance, structural strength, refinement of design... and we have put them all into new and improved steel office equipment, now in production!

This is the time to combine the long-term investment value of steel housing and record-protection with more efficient record-control methods. Many improved systems, especially

developed to speed production of war materials, can now be applied advantageously to increase peacetime operating efficiency.

Talk over your requirements with a Systems Technician. He can point out opportunities to economize with modern steel equipment, simplify administrative control and obtain important record-keeping savings. Just call our nearest Branch Office.

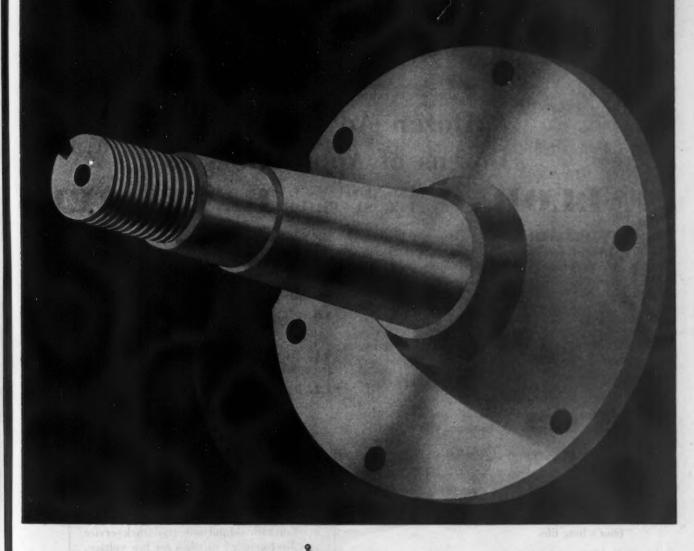
SYSTEMS DIVISION

REMINGTON RAND

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Molybdenum is an economical preventive of temper brittleness in steel.



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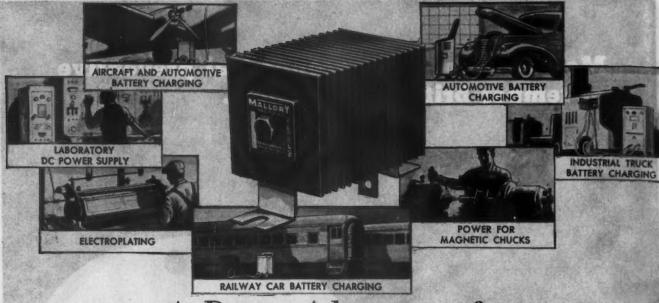
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MOLYBDIC OXIDE, BRIQUETTED OR CANNED .
FERROMOLYBDENUM . "CALCIUM MOLYBDATE"

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A Dozen Advantages for Dozens of Applications...

MALLORY COPPER SULPHIDE RECTIFIERS

WHEREVER you need a dependable source of low voltage DC, Mallory Dry Disc Rectifiers provide these 12 advantages:

- 1. Long Life—Properly applied, many Mallory Rectifiers have been in continuous operation for more than five years!
- 2. More compact than any other dry disc rectifier because the high current rating of the rectifier junction permits much smaller size.
- 3. Rugged, all-metal construction practically immune to mechanical damage and able to withstand severe shocks or sustained vibration.
- 4. Completely sealed to resist atmospheric extremes.
- 5. Constant output over a range of ambient temperatures from -40°F. to 265°F. or higher. No "aging"—constant output throughout the rectifier's long life.
- 6. Will withstand heavy current overloads—tested up to 527°F.

- 7. Self-healing rectifying film if subjected to abnormal high voltage surges.
- 8. Excellent voltage regulation over a wide range.
- 9. Unity power factor.
- 10. Practically no power consumption at "no load".
- 11. Silent operation—no maintenance cost, since there are no moving parts to wear out.
- 12. Wide range of sizes and ratings—Mallory Rectifiers are available in sizes ranging from a tiny "button" to large heavy-duty stacks, in capacities from 0.3 ampere to 175 amperes DC and higher.

Mallory manufactures the following complete rectifier units: Rectostarters* for aircraft... Battery chargers for automotive, aviation, railroad and industrial truck service... Rectopower† supplies for low voltage, medium and high current applications.

Write for descriptive catalogs, showing specifications and many applications of Mallory Magnesium-Copper Sulphide Rectifiers. Our engineers will be glad to help if you have a special problem. Or see your nearest Mallory Distributor.



†Rectopower is the registered trademark of P. R. Mallory & Co., Inc., for rectifier power supply units.

P. R. MALLORY & CO., Inc., INDIANAPOLIS 6, INDIANA

*Rectostarter is the registered trademark of P. R. Mallory & Co., Inc. for rectifier units for use in starting internal combustion engine



MAGNESIUM COPPER SULPHIDE RECTIFIERS—
STATIONARY AND PORTABLE D. C. POWER SUPPLIES—
BATTERY CHARGERS AND AVIATION RECTOSTARTERS*



Be sine un BUT!

HIGH LIFT TRUCK

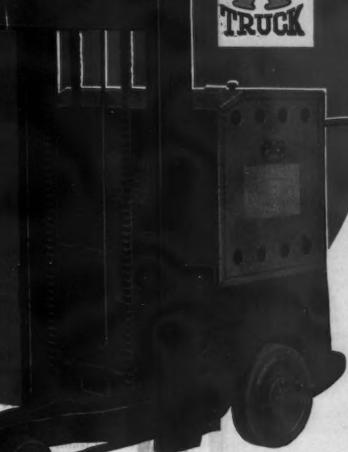
WHIGH PHISSARD Model TRC-6. This track has a capacity of from 2,000 to 2000 lbs., operates on a tuming radius of 6 feet and has a length overall of 65 maches. The platform lift is 5 feet.

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WRIGHT-HIBBARD INDUSTRIAL ELECTRIC TRUCK CO.

PHELPS, NEW YORK

HERE is the Bond that Guarantees your product

That almost invisible Line is the fusion point that gives Granite City Superbond Stainless-Clad Steel longer life and more satisfactory service

With the rapidly increasing use of Stainless-Clad Steel to brighten the appearance of products, and to give top corrosion resistance at low cost, it is important not to overlook the *vital* factor controlling the value of *any* clad...the bond that binds the stainless steel to the mild

Perfected By Experience—Ten years of experience have enabled the metallurgists of Granite City Steel Company to obtain a bond never before achieved.

Proven Best By Test—Even extreme drawing jobs can be accomplished on the same presses and dies you use for mild steel.

Supervised Process—The secret is a job-fitting formula, carefull controlled throughout production by a process that is a combination of faster rolling, greater heat, and more pressure. As a result, you are assured of a finer, more lasting product at no additional cost when you see SUPERBOND Stainless-Clad Steel.

Superbond Stainless-Clad Steel has hundreds of uses

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which contains complete information and technical data on SUPERBOND Stainless-Clad Steel.



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OSTER "WILCO"
PIPE THREADING
SPEEDS!

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No. 704 "WILCO"

Pipe Siz	e					7	breading Time
1"01		V	ij.				16 seconds
11/4"							16 seconds
11/2"							24 seconds
2"00	16	V	g	4		00	25 seconds
21/2"							38 seconds
3"							40 seconds
31/4"							56 seconds
4"							58 seconds

No. 706 "WILCO"

Pipe Siz	e				7	Threading Time
11/2"						19 seconds
2"						20 seconds
21/2"						30 seconds
3"		10				31 seconds
31/2"						48 seconds
4"						49 seconds
5"						70 seconds
6"						74 seconds

Note: Above time studies based on cutting full American National Standard pipe threads at recommended speeds. Easy operation and threading speeds of Oster "WILCO" pipe machines recommend them for either production or maintenance threading. In many shops they serve the dual purpose.

The "WILCO" die-head and one set of holders and chasers thread the standard range of each machine. A simple adjustment of the cam lever sets chasers to any size of pipe. The lever is equipped with a micrometer adjustment for extreme accuracy in setting chasers for any depth thread desired.

Regular equipment furnished with each machine includes one complete set of right hand, bigb speed steel pipe chasers with holders, threading all sizes within regular range; cut-off device with three centering guides; bigb speed steel cut-off tool; bigb speed steel reaming and chamfering forming tool; oil pump and reservoir; three-jaw, gripping chuck on front of spindle; four-jaw centering chuck on rear of spindle; motor of required standard specifications and non-reversing, magnetic controls.

Two "WILCO" Models

No. 704. Standard range 1" to 4" pipe. Extra range 1/4" to 3/4" pipe. Bolt range 1/4" to 3":

No. 706. Standard range 1" to 6" pipe. Bolt range 1" to 4".

There's an Oster Distributor near you. If you don't know his location, write us for complete details.

THE OSTER MANUFACTURING COMPANY, 2038 EAST 61st ST., CLEVELAND 3, OHIO, U. S. A.



.. Symphony In Brass...

It will be sweet music to your ears to know your peacetime requirements of Precision Brass Screw Machine Products can be fully met by The Chicago Screw Company.

If you manufacture any one of the thousands of new peacetime products using Brass Screw Machine Parts you will find us a dependable source of supply. Any quantity—Any Shape—Any Size to 5" diameter including such finishing operations as Milling, Broaching, Grinding Thread Rolling, etc., can be furnished exactly to your specifications... We have the "Know-



How", proper facilities and a sincere desire to serve you.



THE CHICAGO SCREW CO.

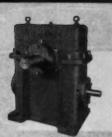
1026 SO. HOMAN AVE. CHICAGO 24, ILL.

DOO Established 1888

POWER SAVING PRODUCTS



Continuous-Tooth Herringbone Gear Speed Reducers



Type "H" Worm Gear Speed Reducers



Planetary Gear, Speed Reducers



Motorized Planetary Gear Speed Reducers

We have been making various types of cut gears and gear speed reducers for many years ... Our extensive present day facilities for their manufacture are the outcome of developing an organization that would capably handle our resultant expansion . . . These facilities give us a capacity that readily handles industry's power-saving requirements.

Our experience of over 58 years of manufacturing various types of gears and gear reducers is invaluable in the selection of the proper type of gear speed reducer for your power-saving transmission problems.

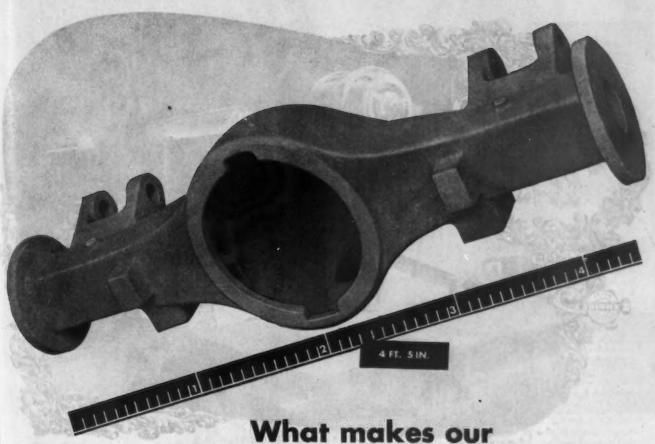


D.O.James Gear Sales-Engineers are located in key industrial centers.

D.O.JAMES

MANUFACTURING CO.

MAKERS OF EVERY TYPE OF GEAR AND GEAR REDUCER



What makes our Motor Vehicles so GOOD?

• The war years have shown how supremely good American motor cars and trucks are.

Millions of the cars running today have stood up, year after year, with a minimum of attention, and almost no replacement parts.

One reason for this record—and an important reason—is that so many crucial automotive parts are steel castings.

These are usually the parts that must take the hard knocks and the grief—parts that are strong, to resist wear and fatigue—parts that have built into them the steel properties that permit them to do their job. A notable example is the truck rear axle housing pictured above.

Here is more proof of the advantages of steel castings—a definite assurance that steel castings can do for your product exactly what they are doing for motor vehicles.

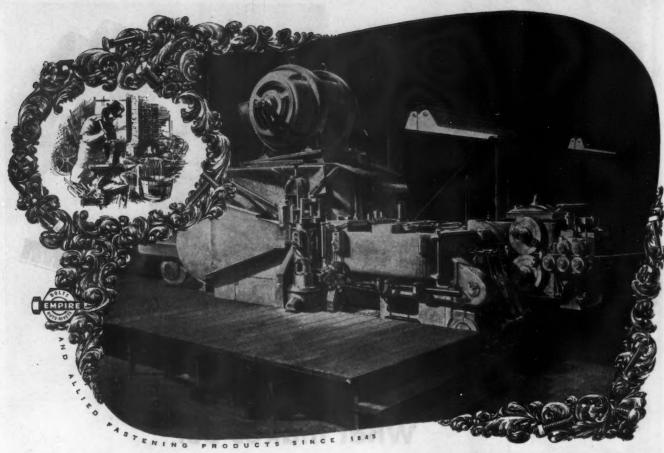
Organized research and broad experience enables the steel founder to deliver to you parts with the properties you need specified in advance.

Steel castings are versatile, dependable, economical. Let your own foundryman tell you more about their possibilities for you. Or write to Steel Founders' Society, 920 Midland Bldg., Cleveland, Ohio.

MODERNIZE AND IMPROVE YOUR PRODUCT WITH

STEEL CASTINGS

DUCER



These are the things that make America strongs enterprise, ingenuity, an eagernss to answer challenges . . . characteristics which have helped the bolt and nutr business to meet the increasingly severe requirements of General Industry.

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... THROUGH 100 Eventful Gears

Bolts and nuts used to be fashioned, one at a time, by mighty men — by blacksmiths.

Then, almost a century ago, far-sighted Yankees instituted a new principle in bolt manufacture, embodied in the world's first automatic cold-heading machine.

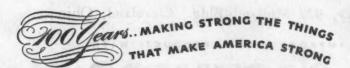
The higher production and improved quality and strength of bolts turned out by the Ward Header meant that General Industry could also make important new strides in mass-producing quality products . . . and that more severe service conditions would be met with even greater fastener security.

From 1845 when RB&W shipped its

to the present when streamlined trains or high speed trucks hurry them on their way

the present when streamlined trains or high speed trucks hurry them on their way . . . developments and control and treatment have constantly helped to improve

the strength, accuracy and finish of RB&W EMPIRE Bolts and Nuts... Today, upon its 100th anniversary, with its products being used by most of the world's leaders, with the quality of those products reflecting the importance of fasteners in the great pattern of Industry... RB&W pledges continuance of its traditional policy of investing heavily in research and equipment... so that RB&W EMPIRE will continue to stand for the utmost in dependability.





RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

Factories at: Port Chester, N. Y., Coraopolie, Pa., Rock Folls, Ill. Sales offices at: Philadelphie, Detreit, Chicago, Chattanoago, Lee Angeles, Portland, Seattle, Discontinuous Chicago, Chestanoago, Lee Angeles, Portland, Seattle, Discontinuous Chicago, Chestanoago, Taleston, Carolina, Carolina



Ask your Maintenance man about High Safety Factor Electrical Insulation

Trouble-shooting maintenance men, whose primary jobs are to prevent shutdowns and to see that repairs make equipment as good as or better than new, will tell you that Fiberglas* Electrical Insulation Materials are the answer to many of their problems.

This better insulation material provides "extra" protection against the conditions which cause most motor burnouts. Impregnated Fiberglas has exceptional temperature, moisture and insulation resistance; high tensile, dielectric and impact strength; and an especially favorable space factor.

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More and more design engineers, as well as maintenance men, are standardizing on Fiberglasbase Materials. They provide high Safety Factor insulation for electrical equipment which may be operation. These are the conditions heavy time-and-dollar loss in nearly every industry.

APPLICATION DATA

There is a Fiberglas-base Material to meet virtually every requirement. Performance and application data, as well as facts about the various types of Fiberglas Electrical Insulation Materials are included in catalog EL 44-7. Write for your copy today and ask for the name of the supplier located nearest to you. Owens-Corning Fiberglas Corporation, 1871 Nicholas Building, Toledo 1, Ohio. In Canada, Fiberglas Canada Ltd., Oshawa, Ont.

subjected to such hazards as heat, dirt, moisture, corrosive acids, overloads and careless handling or which frequently cannot be anticipated by the manufacturer, yet are among the chief causes of

> Fiberalas Treated Sleeving can be cut to short lengths without fraying. Single Saturated is also widely used on pigtail brush leads, leads on small armatures,



Write for catalog EL 44-7, today.

FIBERGLAS

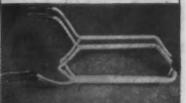
ASK FOR FIBERGLAS...IN YOUR NEXT NEW MOTORS...AND ON YOUR NEXT REWIND

ELECTRICAL INSULATION MATERIALS

Insulation Material for every need

There is a FIBERGLAS

Fiberglas-insulated magnet wire in sizes from heavy # 0000 to fine # 42, and Fiberglas-insulated lead wires, both meet a wide variety of applications.



Treated or untreated Fiberglas Tape is used to insulate practically all sizes and types of coils.

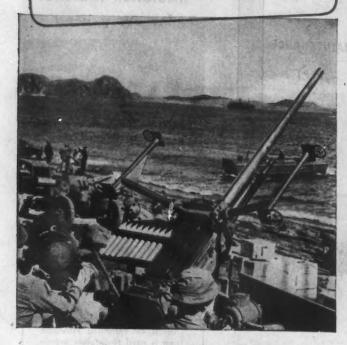


Varnished Fiberglas Cloth is used for slot and phase insulation, high dielectric and high temperature coil form insulations, etc.

single transformers, etc.

THE IRON AGE, October 4, 1945-233

"Penola Prescriptions"



THE PROBLEM... In the production of 37-mm. shells for anti-aircraft, a delay was caused by trouble with certain bearings in the automatic machining equipment. In spite of frequent lubrication with what was considered a proper grease, the bearings had to be replaced within 230 hours of each repacking.

THE DIAGNOSIS... A Penola consultant found that the bearings, which were located on the synchronous recovery pick-off spindle attachment, would not retain the lubricant. The lubricant in use squeezed out under high operating pressures and therefore could not supply adequate protection for the bearings without frequent replenishment. This was costly; dangerous, too, in case the bearings were not closely watched.

THE PRESCRIPTION



LADEX LUBRICANT 2

This extreme pressure lubricant, which has been found highly satisfactory for application entailing great pressures, proved to be the solution to this problem. The use of Ladex Lubricant 2 has resulted in satisfactory bearing service for periods as long as 483 hours. Production delays have been cut down, and there has been a substantial reduction in costs.

PENOLA LUBRICANTS

PITTSBURGH, PA.

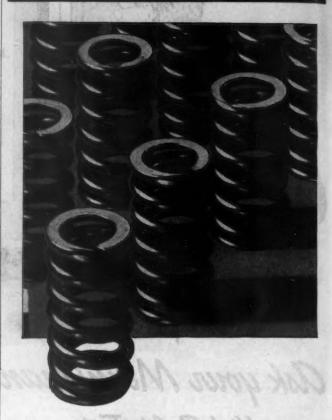
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PENOLA PRODUCTS HAVE MEANT EXTRA PROTECTION SINCE 1885

234-THE IRON AGE, October 4, 1945

SPRINGS by LEE



LEE SPRINGS are designed to meet all production problems. But it frequently happens that special conditions call for special treatment. In such cases we make a study of these conditions, preparing a Lee Spring that will stand up to the most exacting tests.

A manufacturer, facing a new spring problem, may take it up directly with our main office. It should be remembered that many variable factors enter into the selection of the proper spring. Therefore, it is urged to describe the spring operation as completely as possible. (A sketch or sample will help.)

Bulletins on request

LEE SPRING COMPANY, INC.

30 Main Street

Brooklyn 1, N. Y.





Staple Forming Th

This plunger type, No. 2 model insures greater speed without impairment of accuracy. Nilson has been designing and building special machines for half a century, and current improvements consist almost entirely of special attachments, patented features and stream-lining. A special attachment on this model, for example, is made for producing chisel-point staples, another reason why Nilson machines give you the

best in low cost production. If your business entails the manufacture of wire products, punched patterns, chains, etc., investigate Nilson equipment. Somewhere along the line you'll hit upon the

very machine you need.

SCARECROWS

DON'T BE "S-H-O-O-O-E-D" AWAY from economical and efficient abrasive performance by "scarecrows" of inexperience and prejudice! If you want quick and uniform results—always reliable—always at lowest cost—there is only one sure guarantee. Insist on "CERTIFIED" STEEL ABRASIVES. No other matches their proven worth. A size for everyneed. Write for details.



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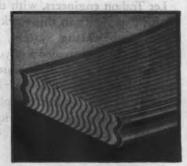


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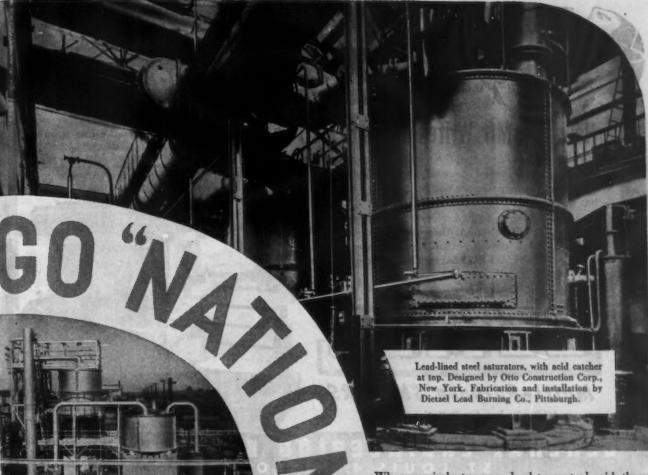
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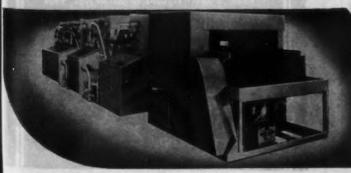


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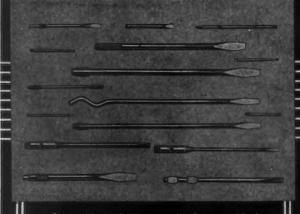


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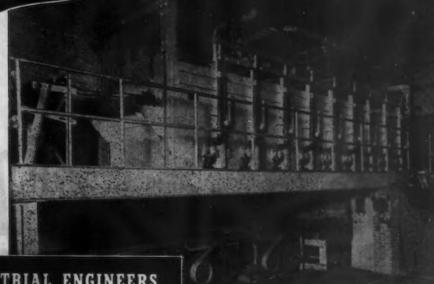
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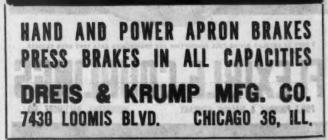
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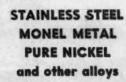


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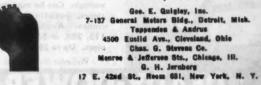
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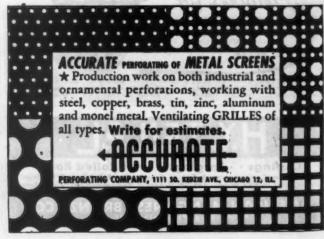
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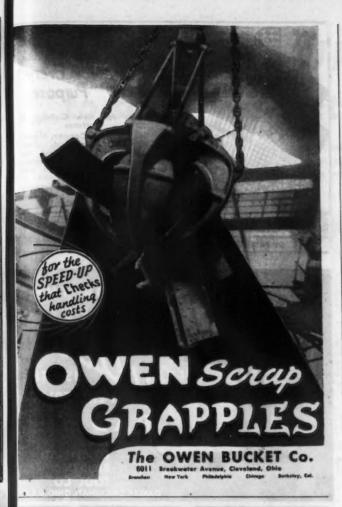
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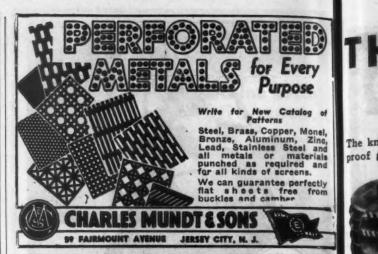
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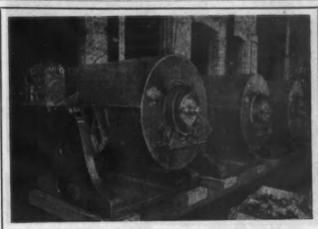


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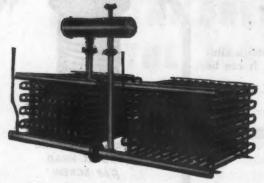
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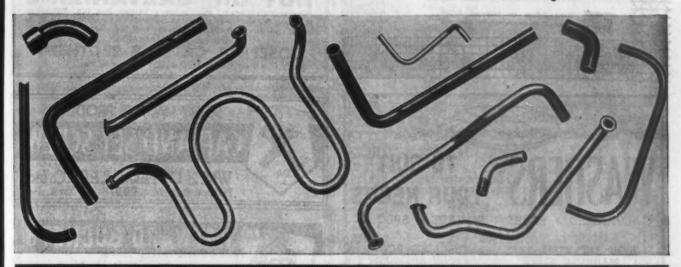
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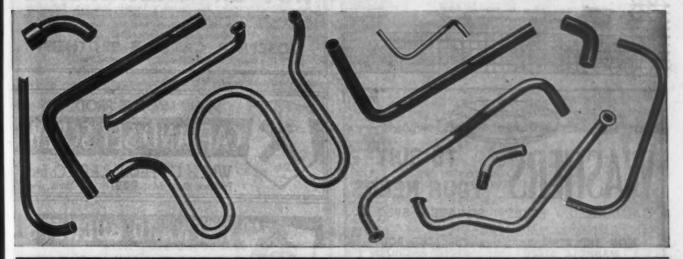
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area 18"x17"
area 18"x17"
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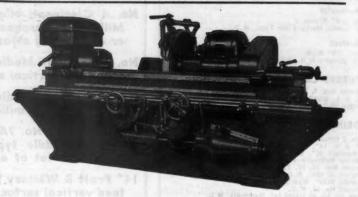
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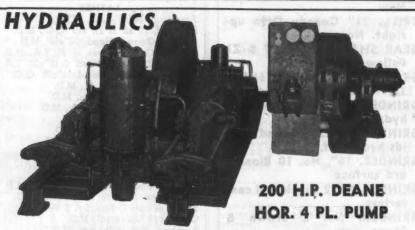
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1	10	Whse.	1	SK	13800x230/460
2	15	G. E.	1	25 су.	4400x180/860
4	500	Pitts.	1	OISC	13200x2300
3	50	G. E.	1	KHA	18800x115/220
3	50	Packard	1	OISC	2200x110/220
4	75	Pitts.	1	OISC	23902575
2	85	G. E.	2/6	KQH	2300x165/82.5
3	100	Whse.	1	SK-25 es	r. 6900x220/440
2	100	G. B.	1	A	2200x115/280
1	100	Whse.	1	OISC	11430x250
8	100	Whee.	1	OTSC	18200x250
8	160	G. E.	1	HIDD	13200x445/226
1	200	G. E.	1	H	2300x115/230
1	200	G. E.	2/8	Auto	2500x2500
3	200	G. B.	1	HJ	2300x408/204
1	200	Whse.	. 1	SK	6600x220/440
2	200	G. E.	1	HKDD	13800x220/440
3	200	G. R.	1	HLLD	27600x115/480
1	200	G. E.	1	HKS :	2300/4000x115/230
8	300	Packard	1	OTSC	2300x230/460
1	300	Pitts.		OTRC	4150x208/120
3	300	G. E.	1	H-25 Cy	. 13800x575/2300
2	333	Whse.	1	OISC	2300x460
3	333	Moloney	1		00/11000x2300/575
2	333	Pitts.		OISC	2400x220
4	375	Whae.		OTSC	5500x380
4	525	G. E.	1	HJ	2300x445
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(1)	434	Westghse	K-2			715
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(2)	5	Westghse	H.K	2		850
(1)	6	G.E.	C.0	1805		1150
(1)	7%	G.E.	C.O.	-1804		725
(2)	7%	Westghse	K-4			725
(1)	7/9	C.W.	Size	A.W.		740/580
(1)	7/10	G.E.	M.D	102 (ba	ek axle)	1625/800
(1)	10	P&H	Size	9x536 (5	00-volt)	700
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(1)	15	G.E.	C.0	-1806		650
(1)	30/42	C.W.	Size	D.W.		629/520
(1)	35	G.E.	C.0	1810		500
(2)	30/37	Westghse	M.(No. 50	(C.P.)	550/500
(2)	35/45	Westghee	M.I	0104%	(C.P.)	625/500
(2)	4216	Westghee	K-8	E & 21		910
(2)	52	Westghse	K-1	0		740
(2)	52	Westghee	K-1	0 (back s	zle)	740
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4/0	2.25		1.79	
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5/0 4/0 3/0 2/0	2.03	1.82	1.65	.70
. 0	2.03	1.71	1.54	.50
100	2.25	1.76	1.60	.50
2	2.48	1.82	1.65	.65
3	2.70	1.82	1.65	.75
4	3.15	1.98	1.79	.90
5	3.38	2.12	1.93	1.00
6	3.83	2.59	2.34	1.15
7	4.50	3.19	2.89	1.25
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10,000#	1/4 x 3 x 84"	4027
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25,000#	5/16 x 4 x 14'-0"	1020
5,000#	3/2 x 1 x 70"	1035
70,000#	1/2 x 5 x 14'-1/17"	1025
40,000#	1/2 x 15/8 x 9'-7"	1035
6,000#	9/16 x 13/8 x 10'-6"	1020
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1,000 %	78 × 1 × 10 -2	1033

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SURPLUS, OBSOLETE and REJECTED STOCKS: New and used BUILDING & STRUCTURES: Steel CRANES: Greund, Overhead and Gantry. Also Run-OWER PLANT EQUIPMENT: Bollors, Generators, Turbines, Meters, etc.
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ABANDONED PLANTS, MACHINERY & EQUIPMENT
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IRON & STEEL PRODUCTS, INC. 40 years' experience 13496 S. Brainard Ave., Chicago 33, Illinois

SELLERS BUYERS TRADERS

FOR SALE HYDRAULIC PUMP DEANE

HORIZONTAL DUPLEX DOUBLE ACTING

Size 31/2 x 12, cap. 106 g.p.m., @ 2000#

Synchronous Motor 105 H.P. 450 R.P.M. 3/60/440. With Exciter and Panelboard Mig. by Electric Machinery Co. Motor was used with pump @ 1500# will sell separately or together, priced right for immediate sale. Excellent condition.

Kody Engineering Co.

26 Commerce St., Trenton 5, New Jersey

COMPRESSORS

528 CFM Ingersoll-Rand, Style "J" 940 CFM Ingersoll-Rand Imperial Type 10 horiz., 2 stage, steam driven Others, too, 100 to 2,000 C.F.M.

CRANES, Locomotive

30/40 ten industrial, steam, 80' beem 40 ten Ohie, Model "G" steam, 40' beem with 10' whipend

CRANES, Overhead

2 ton Shepard-Niles 60' spam 230 D.C. 150 ton Whiting, 30' span, two 25 ton each aux, hoists 5 meter cab control, 3/60/440

FORGING EQUIPMENT

7" Ajax Upsetter 3000# Chambersburg Steam Drop Hammer

LOCOMOTIVES

10 ton Davenport-Besier, std. ga., diesel, Type 0-4-0 1, 70 ton 0-6-0 Switcher, ICC condition 1, 87-ton, 2 Unit Westinghouse, Diesel, Elec. Loce.

SHOVELS AND CRANES

320-B Bucyrus Erie Electric Stripping, 6½ yd. Priced low enough to justify purchase for spares

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60,000 gallen Water Tank, 98' tower with 10" riser pipe

TRACTOR WAGONS

7, 71/2 cu. yd. Allis Chalmers Speed Ace. Hydraulie dumping and closing

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50 Ton Industrial Loco Crane 30 Ton Industrial Loco Crane 35 Ton McMyler Loco Crane 120 Ton Locomotive, Switcher.

STONE the Crane Man 2457 Weedward Ave., Detroit I. Mich



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MATERIALS FOR SALE

Steel Tubing—Outside diameters 3½", 3½", 2½", 2½", 2½", 2", 1¾", 1½", ½", ¾". Thickness 13, 14, 16, 18 gauge.

Steel Strip-11/2" x 3/8".

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with 10'

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ec. Loco.

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riser pipe

Hydraulie

i, Inc.

EEL"

GS

O INC

Channels -11/2" x 1/2" x 1/2" x 1/8".

Steel Machine Bolts—3/8" x 1", 11/4", 11/2", 2"; 1/2" x 2"; 3/4" x 31/2", 4".

HARCO STEEL CONSTRUCTION CO. 1180 East Broad St., Elizabeth 4, N. J.

LONG ESTABLISHED REPUTABLE CONCERN WITH SUBSTANTIAL CAPITAL

WILL BUY FOR CASH

Assets, Capital Stock, Family Holdings of

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Among other considerations, you may realize certain desirable tax advantages

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BOX 1204, 1474 BROADWAY, NEW YORK (18), N. Y.

We BUY and SELL **New Surplus Pipe & Tubes** Steel Buildings Tanks

Valves and Fittings Plates, Bars & Structural Steel

JOS. GREENSPON'S SON PIPE CORP. Natl. Stock Yds., St. Clair Co., III.

Recently Purchased —

ONE MILLION LBS.

SURPLUS NEW ALUMINUM

Sheet — Plate — Angle — Bar — Rod — I-Beams, etc.

Phone, wire, or airmail us your requirements

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For quick sale and prompt delivery will sell the following subject prior sale, same located Kansas City, Missouri, and in interchange condition:

8—Class III—8,000 gal. \$725.00 each 3—Class III—8,000 gal., Coiled, \$775.00 each 28—Class II —8,000 gal., \$575.00 to \$625.00 each

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WRITE, PHONE OR WIRE

BROWN-STRAUSS CORP.

KANSAS CITY 10, MISSOURI Mail-P.O. Box 78 Phone-LD Phone-LD 169

FREIGHT CARS FOR EVERY NEED! Now only half of recent peak prices. As low as \$500.001

DULIEN

7—Hopper, Twin, 50-Ton
80—Hopper, Side Discharge, 50-Ton
80—Hopper, Side Discharge, 50-Ton
80—Hopper, Side Discharge, 50-Ton
90—Refrigerator, 40-Ft., 40-Ton
10—80x, Automobile, Steel, 50-Ft., 50-Ton
8—Dump, Magor, 30-Yd., 50-Ton; lift doors
1—Dump, Clark, Automatic, 30-Yd., 50-Ton;
1—Dump, Clark, Automatic, 30-Yd., 50-Ton;
15—Gondolas, 50-Ton, All Steel

All cars are priced to sell

IRON & STEEL PRODUCTS, INC.

40 years' experience

13496 S. Brainard Ave., Chicago 33, III. "ANYTHING containing IRON or STEEL"

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SPECIAL 180-All Steel 50 TON Hoppers

25-40 ton steel u/f flats.
30-50 ton steel u/f flats.
15-30 ft. all steel Gons. Al condition.
25-50 ton steel u/f bux cars.
25-50 ton all steel Gons.
25-30 ten steel Gons. Bt. Go. Bit. 1928.

LOCOMOTIVE CRANES Saddle Tank Locomotives

RAILS

Complete Stocks at 005 055 755 705 005 005 and lighter weights, with angle hers, carried at grissipal peints throughout the country, smilable for rall or water shipment.

HYMAN-MICHAELS COMPANY

SURPLUS STEEL TUBING

1 5/16" O.D. x 3/16" WALL 3'4" O.D. x %" WALL 3'4" O.D. x %" WALL 4" O.D. x %" WALL 4" O.D. x %" WALL

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122 So. Michigan Ave.

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Chicago 3

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RELAYING RAILS (MACHINED STRAIGHTENED)

Immediate Shipment

MIDWEST STEEL CORPORATION CHARLESTON WEST VIRGINIA

MAGNETS

6-45" E. C. & M. 2-55" E. C. & M. 1-65" E. C. & M.

For magnets, see Geodman, The "Magnet Man" GOODMAN ELECTRIC MACHINERY CO., 60 Broad St. Newark 2, M. J.

DULIEN STEEL PRODUCTS, Inc. OF WASHINGTON 1008 Westers for. 1008 Westers for. 1008 Westers for. 1008 Westers for the second step. 1008 Westers 1808 Western fire, SEATTLE 4, WASH

New RAILS Relayers

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Rail, Accessories & Equipment

All sizes and weights. Also frogs, switches, spikes, bolts, tie plates, contractors' and mine equipment carried in stock.

180 Lexington M. K. FRANK 480 Lexington
Ave., New
York, N. Y.

Reno, Nevada
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and accessories

I—Westinghouse, 2-Unit, 87-Ten, 600 HP, Diesel Electric Locometive. Built 1928. T/E 52290-2 2-44-Ten Westinghouse Electric 600 V. D.C. Excel-lent Condition. Just Overhauled. Other Locometives Teel . . . Send Us Your inquiry!

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NEW AND RELAYING TRACK ACCESSORIES

from 5 Warehouses

- PROMPT SHIPMENTS FABRICATING FACILITIES
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L. B. FOSTER COMPANY

PITTSBURGH NEW YORK

SAN FRANCISCO

-25-ton Ohio Locomotive Crane, 50' boom,

New and Used RAIL & INDUSTRIAL EQUIPMENT CO.

30 Church St., New York 7, N. Y

WANTED TO BUY

1 Press Brake, 1000 ton capacity, actual working length of Die Surface 10' to 14'. Want to use machine for Multiple Punching. Approx. 50 HP 220/440 V Motor.

One Multiple Drill Press, 12 Spindle—for straight line drilling and counter sinking, capacity 1/8". Spindle heads to have 3" minimum drill centers.

One Shaper, 24" Standard Rapid Traverse Shaper.

One Planer, "Open Side", 36"x36", or 48" x 48" x 12' to 18'. Rapid Traverse. 2 Rail heads—1 extra side head. Forced feed lubrication to Vees. Forced feed lubrication to bearings. Dial Feed.

One Plate Shears, 1" x 10'0", 24" throat. Must be 1" capacity at least 24" throat-40 or 50 HP Motor 220/440V.

One Bar Shears, Power Driven Bar Shears, capable of cutting 11/2" Round Bars, capable of cutting 6 x 3/4

One Double End Angle Shears, Power Driven, Capacity 6 x 6 x 3/4.

One Single Angle Shears, Power Driven, Capacity 3 x 2 x 1/4.

One Power Hack Saw, 18" x 18" capacity. Will consider only late model.

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Two Threading Machines: 1-5/16" to 11/4". 1-11/8" to 21/8".

One Lathe, 16" or 18" Swing-16' Bed. Should take approx. 12'0" between centers with tail stock flush.

One Radial Drill, 5' Arm, 13" to 15" Dia. Column.

One Air Compressor, Water or Air Cooled. Actual Air delivery at 100#. Approx. 400 to 500 cu. ft.

Three Drill Presses, Sliding Head Upright

1-12" -18" 1-24"

One Spot Welder, for welding up to and including

One Airco #40 Travograph (Machine Cutting Torch) for single and 4 torch operation—with magnetic tracer.

Two Bar Shears for cutting reinforcing bars—Flat knife 10" long, 10" to 12" throat—Capacity 2 bars 11/4" square or 3—11/8" round.

Late models only will be considered and all machines must be in first class operating condition. Reply as quickly as possible giving full information on any unit you have to offer. If possible furnish descriptive literature or photographs. Send replys direct to Paper, Calmenson & Company, 975 E. 7th Street, St. Paul 6, Minnesota, attention Plant Superintendent.

WANTED TO BUY

Large Stocks of

SURPLUS

STRUCTURALS - SHAPES - RAILS

ROBINSON BROTHERS & CO.

135 SO. LASALLE ST., CHICAGO

FISHER BUILDING, DETROIT

Send Us Your Inquiries For What You Need

WANTED TO BUY

Your Surplus and Idle Inventories of STEEL and Non-Ferrous Metals, which you no longer propose to use, or upon which you have received Government cancellations.

Our concern has had a number of years specializing in the handling of Idle and Surplus Inventories of STEEL Your goods will receive first-class consideration and a fair price will be offered on a clean-out basis: and we are prepared to accept any tonnage, large or small.

We have complete facilities, including a modern warehouse and a railroad siding, and the proper crane equipment to accept material swiftly. and a letter of inquiry from you will bring a person qualified to pass on the material and offer you fast ser-

NORTHEASTERN STEEL COMPANY 352-358 GROVE ST., BROOKLYN 27, N. Y.

WANTED TO PURCHASE

Late model Niagara or Cincinnati square shear; specification 12 \times ½° mild steel capacity. Furnish price, model number and full particulars.

NEW YORK BRASS & COPPER COMPANY, INC. 376 Lafayette Street, N. Y. C.

WANTED
PRESSES: — Inclinable — Double Crank and
Straight Side—All Sizes
WELDERS:—Spot-Butt and Seam
SQUARING SHEARS AND PRESS BRAKES

PRANK J. LUNNEY
"METAL WORKING MACHINERY"
1700 GAMBRIA ST. PHILA. 82. PA.

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Late Model (used) Gardner Opposed Head Disc Grinder 30" Wheels

Address Box No. 7819-A. The Iron Age 10 S. LaSalle St., Chicago 3

WANTED

SURPLUS MATERIAL FOR EXPORT

Galvanized Barb Wire, painted or gal-

Plain Galvanized Wire \$10 to \$22 gauge. Telephone Wire. Galvanized Fence Staples I" & 11/4" x \$9

Flat Head Common Wire Nails. Galvanized Poultry Netting.

Reinforcing corrugated bars 3/" to 1".

Merchant Bars.

R.R. Spikes 1/2" x %" up to 51/2".

Steel Plates 1/8" to 1/2".

H.R. Steel Sheets \$16 to \$28 gauge.

Plain Galvanized Steel Sheets \$16 to \$30

gauge. Galvanized Corrugated Steel Sheets \$22. \$24, \$26 and \$28 gauge. Seamless Steel Boiler Tubes. Std. Steel Black & Galvanized Pipe.

RAILS—New and Relaying 90, 85, 75, 70, 60 and lighter.

RIERA, ZUMETA & TOUS, INC.

40 Water Street, New York 4, N. Y.

WANTED IMMEDIATELY

ELECTRIC MOTORS MOTOR GENERATOR SETS LARGE AIR COMPRESSORS

PAUL JAY New York 13, N. Y.

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to \$30

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INC.

N. Y.

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* PLATINUM SILVER * SILVER SOLDER

SCRAP OR SURPLUS IN ANY FORM

Write and tell us what you have. If possible ine Or . . . Send let to us—We will evaluate and remit by cheek. Let held intact until cheek is approved.

SHERMAN & CO.

Gold-Platinum-Silver Refiners-Assayers-Smelters-Metallurgists 197 Canal St., New York 13, N. Y.

WANTED 36" VERTICAL SLOTTING MACHINE

With Rotary Table Must be motor driven, and located 2-300-mile radius of Phila.

Address full particulars to Bex No. Z-959
Care The Iron Age, 100 E. 42nd St., New York 17

-WANTED-SURPLUS PIPE

All sizes. State price and condition and where located.

JAMES H. MURRAY, MFG.'S AGT.
185 Summer St., Boston, Mass.
Phone Hubbard 3185-8

WANTED - FLY WHEEL PRESSES

Must be in first-class operating condition

	Press Bed Are	a Slide Area	Shut Height	Stroke	Capacity
2—	17 x 55	12 x 48	101/2"	3"	75 tons
2—	17 x 36	12 x 30	101/2"	3"	35 "
1— (inclinable)	20 x 22	15 x 16	7"	3"	25 "
1-	19 x 33	15 x 30	11"	4"	40 "
1-	28 x 31	28 x 31	7"	3"	35 "
	The above	specifications :	are approximate		

Address all replies to

COLE STEEL EQUIPMENT CO., INC.

195 Front Street

(We Are Not Dealers)

Brooklyn 1, N. Y.

TEN TON MOBILE CRANE

22 ft. to the hook, to swivel 180 degrees.

Need not be fast nor modern, but must be ingood condition.

ADDRESS BOX Z-966

Care The Iron Age, 100 E. 42nd St., New York 15

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MORGAN STEEL CORPORATION 430 Morgan Avenue Brooklyn 22, H. Y.

WANTED STEEL BUILDING

Apprez. 00 to 78 Ft. x 150 to 200 Ft. With Overhood Traveling Cross Most Se Prised Right

BARON STEEL COMPANY

WANTED
Your Business
"ANYTHING containing IRON or STEEL"
MORE FOR YOUR DOLLAR
IRON & STEEL PRODUCTS, INC.
40 Years' Experience
13496 S. Brainard Ave., Chicago 33, Illinois
BUYERS SELLERS TRADERS

BUSINESS OPPORTUNITIES

FOR SALE

Complete Heat Treating Plant Only one within radius of 30 miles.

ADDRESS BOX Z-876 Care The Iron Age, 100 E. 42nd St., New York 17

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YOU
MAY BE LOOKING FOR
READ
THE CLASSIFIED SECTION
of The IRON AGE

PLANT FOR SALE OR RENT CARBONDALE, PA.

Suitable for machinery manufactur-ing or steel fabricating. 48,000' building space, three cranes, 15, 20 and 35 tons, Power Plant and High Pressure Boilers, Air Compres-sors, Railroad Siding, 4 acres of land. Good Labor.

AARON MACHINERY CO.

45 Crosby Street New York, N. Y. FOR SALE

Flanged Fitting business, including tools, jigs and patterns.

Located Eastern Pennsylvania.

ADDRESS BOX Z-950

Care The Iron Age, 100 E. 42nd St., New York 17

EMPLOYMENT EXCHANGE

EMPLOYMENT SERVICE

HIGH GRADE MEN — Salaries \$3,000 to 425,000. Since 1915 thousands of Manufacturing Executives, Engineers, Sales Managers, Comptrollers, Accountants, Sales Engineers, Purchasing Agents, and other men of equal caliber have used successfully our confidential service in properly presenting their qualifications to employers. We handle all negotiations. Forward complete reced for quick action. The National Business Bourse, 20 W. Jackson Blvd., Chicago 4, Ill.

SALARIED POSITIONS. \$2,500 - \$25,000. Reconversion is creating lifetime opportunities now. This thoroughly organized confidential service of 35 years, recognized standing and reputation carries on preliminary negotiations for supervisory, technical and executive positions of the calibre indicated. Retaining fee protected by relaid to the supervision. Identity covered and present position protected. Send only name and address for details. R. W. BIXBY, INC., 274 Delwara Bldz., Buffalo 2, N. Y.

HELP WANTED

HELP WANTED

AGGRESSIVE NEW BUSINESS PRODUCER

Man with experience in the selling of Pressed-Metal Stampings wanted by Eastern manufacturer of formed and drawn metal parts and sub-assemblies. To cover Eastern territory on salary, expense and commission basis. Give full details of experience.

ADDRESS BOX Z-943

Care The Iron Age, 100 E. 42nd St., New York 17

CHIEF ENGINEER

In charge engineering department, old estab-lished company, sheet metal products, number employees 600. Brakes, presses, all types of welding, assemblies, and metal finishing. Preferably an engineering degree. Must have a record of proven accomplishment as chief en-gineer or assistant. Good executive and organgineer or assistant. Good executive and organ-izer. Thorough knowledge of design, tooling, and up to date on new developments and new processes. Salary open. Send complete resume of past experiences, including salaries earned in the past and salary expected.

ADDRESS BOX Z-949 Care The Iron Age, 100 E. 42nd St., New York 19

WANTED

General Superintendent for Steel Foundry Located Mexico. City, Mexico

Young man, engineering training preferred, for largest steel casting plant in Mexico. Several years of successful operation but in need of man with up-to-date progressive ideas in steel casting management. This foundry is a part of a larger operation having open hearth electric furnaces and various other fabricating divisions. The company is owned by American citizens who are now expanding their business in Mexico. This is an excellent opportunity for a young ambitious man who has thorough working knowledge of modern steel casting operations.

Kindly refer particulars to Mr. Alfred Rudd, Shields & Company, 44 Wall Street, New York 5, N. Y. Replies will be held in strictest confidence.

FOUNDRY SUPERINTENDENT

Steel Foundry (East Texas Area)
—Capacity 200 Tons Per Month—

Must have ability to produce

STAINLESS STEEL - PRESSURE CASTINGS

Half of capacity is our own standard products — Globe and Gate Valves

This is a permanent position where ability and knowledge can command an excellent salary

ADDRESS BOX Z-846

Care The Iron Age, 100 E. 42nd St., New York 17

CHIEF ENGINEER: To take complete charge of all design and detailing for structural steel shop located in the deep South. Applicant must have creative ability and be interested in original design. Please reply giving full information as to education, experience, age, etc. Address Box Z-917, care The Iron Age, 100 E. 42nd St., New

Tool & Die Job Shop Superintendent—Detroit—Old established firm operating smodern 100 man ahop desires service of a Superintendent with previous experience in the construction of dies, tools, jigs, fixtures and special machinery. Work includes planning and personal administration and applicant should have knowledge of job shop methods. Please state in detail qualifications, salary, and previous experience. Address Box Z-640, care The Iron Age, 100 E. 42nd St., New York 17.

SALESMAN, EXPD. TUBULAR STEEL PRODUTS, MILL WAREHOUSE DISTRIBUTOR, EXCELLENT OPPORTUNITY. ADDRESS BOX Z-956, CARE THE IRON AGE, 100 E. 42ND ST., NEW YORK 17.

DRAFTSMEN—Designers, Layouts, Checkers, and Detailers experienced in heavy machinery, both mechanical and structural experience. Apply or write to The Engineering Department, The Morgan Engineering Company, Alliance, Ohio.

CHEMICAL ENGINEER OR DESIGNER— Experienced in the designing and operation of process equipment, particularly liquid mixers. Excellent future for the right man. Southern Ohio location. Address Box Z-895, care The Iron Age, 100 E. 42nd St., New York 17. York 17.

OHIO MANUFACTURER WITH MALLE-ABLE and brass foundries and fine postwar prospects desires young metallurgist. Give complete record of education and experience, and salary expected. Address Box Z-412, care The Iron Age. 100 E. 42nd St., New York 17.

SHOP SUPERINTENDENT: Complete charge of shop employing approximately 200 men in the fabrication of structural steel and miscellaneous iron, located in the South. Please give all pertinent information in your initial reply. Address Box Z-918, care *The Iron Age*, 100 E. 42nd St., New York 17.

INDUSTRIAL FURNACE ERECTING ENGINEER wanted for inspector of heat resisting alloy foundry located in middle west with good post war husiness. Give full qualifications in your application along with salary desired. Address Box 2-932, care The Iron Age, 100 E. 42nd St., New York 17.

DESIGN ENGINEER

Age 35 to 50; must possess thorough knowledge in the design of precision automatic machines and accept responsibility for planning and designing equipment leading to greater mechanization of production operations.

SR. TOOL DESIGNER

Age 35 to 45; must be experienced in the design and development of small interchangeable tools and dies. Creative ability required. Practical toolroom experience is an essential qualification.

ENGINEER CHECKER

Age 35 to 45; graduate engineer experienced in checking intricate precision machine and tool designs. Should have designing and practical shop experience.

These openings are with a well-established and progressive organization engaged in the manufacture of small metal articles to close tolerances and offer unusual opportunities for men with executive ability and initiative. Plant located near New York City.

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Write fully giving details of experience, education and salary requirements.

BOX 246 REALSERVICE 110 W. 34TH ST., N. Y. 1, N. Y.

SALES ENGINEER

Philadelphia Chicago Milwaukee

To sell complete line of precision casting equipment and supplies—new fast-growing process. Man with metallurgical or foundry experience preferred. Knowledge of precision casting not required. Excellent opportunity in a wide open field.

ADDRESS BOX Z-243

Care The Iron Age, 100 E. 42nd St., New York 17
All replies will be kept confidential.

DRAFTSMEN. Large steel company in Pittsburgh area has several opportunities for draftsmen with high school or college education and experience in the following areas: design of steel mill and steel foundry products; railroad track accessories; layout and design of steel mills, blast furnaces, open hearth furnaces, and power plant; design of fabricated concrete bars; layout of electric power and control equipment; general mechanical design and layout. Please submit details, statement of experience and education, inexpensive photograph, and required minimum earnings. Address Box Z-787, care The Iron Age, 100 E. 42nd St., New York 17.

FAN ENGINEER OR DRAFTSMAN—Southern Ohio well known Axial Fan and Blower manufacturer requires services of a good man already experienced in fan engineering. College man preferred, but not necessary. Excellent future. Address Box Z-894, care The Iron Age, 100 E. 42nd St., New York 17.

STRUCTURAL STEEL DRAFTSMEN. Post war work with Company of long experience. Write P. O. Box 2057, Milwaukee 1, Wis.

WANTED: FINISHING ROOM SUPERINTENDENT, Southwestern Steel Foundry. Address Box Z-889, care The Iron Age, 100 E. 42nd St., New York 17.

HELP WANTED

HELP WANTED

REPRESENTATIVES WANTED

ENGINEERS WANTED

Mechanical Electrical Civil

Preferably those with **EXPERIENCE** ADAPTABLE TO AIRCRAFT

Layout Draftsmen Aerodynamicists Stress Analysts

Or others with at least several years of en-gineering experience which will serve as a basis for aircraft work. Permanent positions are available in the en-gineering of such planes as the Martin 292 tramsport, commercial version of the Martin MARS, and other new commercial and mili-tary commitments. Write including full in-formation on education, experience and back-ground,

to Director of Engineering Personnel.

THE GLENN L. MARTIN CO.

CHIEF RESEARCH ENGINEER

A well established and progressive organization located nearby New York City, engaged in the mass production of small precision metal articles needs an eminently qualified man, age 40 to 50, to head up its Research Depart-

This man must be capable of heading a research organization dealing in me chanical, metallurgical and electrochemical problems; preferably one with wide experience in the mechanical field. He must have already demonstrated ingenuity, inventiveness and executive ability.

Write complete details of experience, education and salary requirements.

BOX 219 REALSERVICE 110 W. 34th ST., N. Y. 1, N. Y.

TUBE MAN WANTED. TO TAKE FULL CHARGE OF PRODUCTION. WE ARE ABOUT TO RESUME THE MANUFACTURE OF ELECTRIC WELDED STEEL TUBING AND MOLDINGS. EXCELLENT OPPORTUNITY FOR THE RIGHT MAN. UNITED STATES TUBE & FOUNDRY COMPANY, INC., 491 WORTMAN AVENUE, BROOKLYN 8, NEW YORK.

ENGINEERING DRAFTSMAN. Old, nationally famous steel plate fabricator serving oil refineries and allied industries requires services of experienced steel plate detailers. Permanent iob under large expansion program. Give complete personal and experience record. Address Box Z-858, care The Iron Age, 100 E. 42nd St., New York 17.

WANTED — SUPERINTENDENT SHEET METAL PLANT employing 50 men. Ideal working conditions, modern equipment and building. Fabricating 16 gage to one-quarter incheplate. Well established financially and with trade. Salary plus a real opportunity to the right man. Address Box Z-908, care The Iron Age, 100 E. 42nd St., New York 17.

ESTIMATOR WANTED, by large Eastern steel fabricator. Must be unemployed at present, immediately available, thoroughly experienced in structural steel estimating. Knowledge of general blate work desirable. Location New York City. Give full information re: salary, experience, references and availability in first letter. Address Bax Z-922, care The Iron Age, 100 E. 42nd St., New York 17.

Exceptional Opening for SALES ENGINEER

to Cover Mid-West Metalworking Industry

Selling Experience Desirable **But Not Essential**

Nationally known manufacturer of production material wants man to advise customers on applications—not take orders—in the middle west area centering in St. Louis. Salary to be commensurate with experience.

Requirements: Varied knowledge of metalwork-ing production gained by plant work or sell-ing; ability to travel away from home. Write in detail about background; enclose photo. Interview arranged at New York headquarters; expenses paid, if necessary.

ADDRESS BOX Z-914 Care The Iron Age, 100 E. 42nd St., New York 17

TOOLROOM SUPERINTENDENT

A well established progressive company requires the services of a quali-fied Toolroom Superintendent. Essential requirements are an engineering background and a minimum of 10 yrs. diversified practical experience in the manufacture of small interchangeable dies and tools.

He should have the ability to plan and direct results and secure results eco nomically. The company is nationally known and is engaged in the manufacture of small metal articles. Location near New York City.

Age 40-50. Write fully giving details of experience, education and salary requirements.

BOX 18 REALSERVICE 110 W. 34th ST., N. Y. 1, N. Y.

SALES MANAGER with successful sales record, by one of the leading manufacturers in the metal cutting tool industry. State age, education, experience, special qualifications and compensation desired.

Box C-531, The Iron Age 1016 Guardian Bidg. Cleveland 14, Ohio

POSITION AVAILABLE for qualified in-dividual experienced in supervision of Board Drop Hammer Shop, Hot Upsetting, Forging, Die De-sign, and Estimating. Address P. O. Box 1798, Columbus, Ohio.

REPRESENTATIVES WANTED

FACTORY REPRESENTATIVE

To represent manufacturer of shot-blast and grit. No objection to other son-conflicting lines. Substantial commission. Adviso territory being covered, and lines carried. Sales background and type of trade contacting. Give phone, and address for personal interview.

ADDRESS BOX Z-907 Care The Iron Age, 100 E. 42nd St., New York 17

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Each time the ticking sound of a watch movement is heard, important phases of life begin and end. Whether it be in the form of a service-man's watch or in the delicately assembled timing device of an anti-aircraft shell, time must be accurate and dependable. Making good time for the past eightyeight years, the U.S. Time Corporation of Waterbury, Connecticut, has devoted their entire experience and effort since Pearl Harbor supplying precision-built instruments of war.

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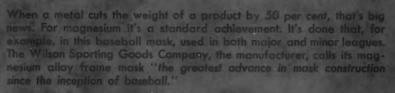
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